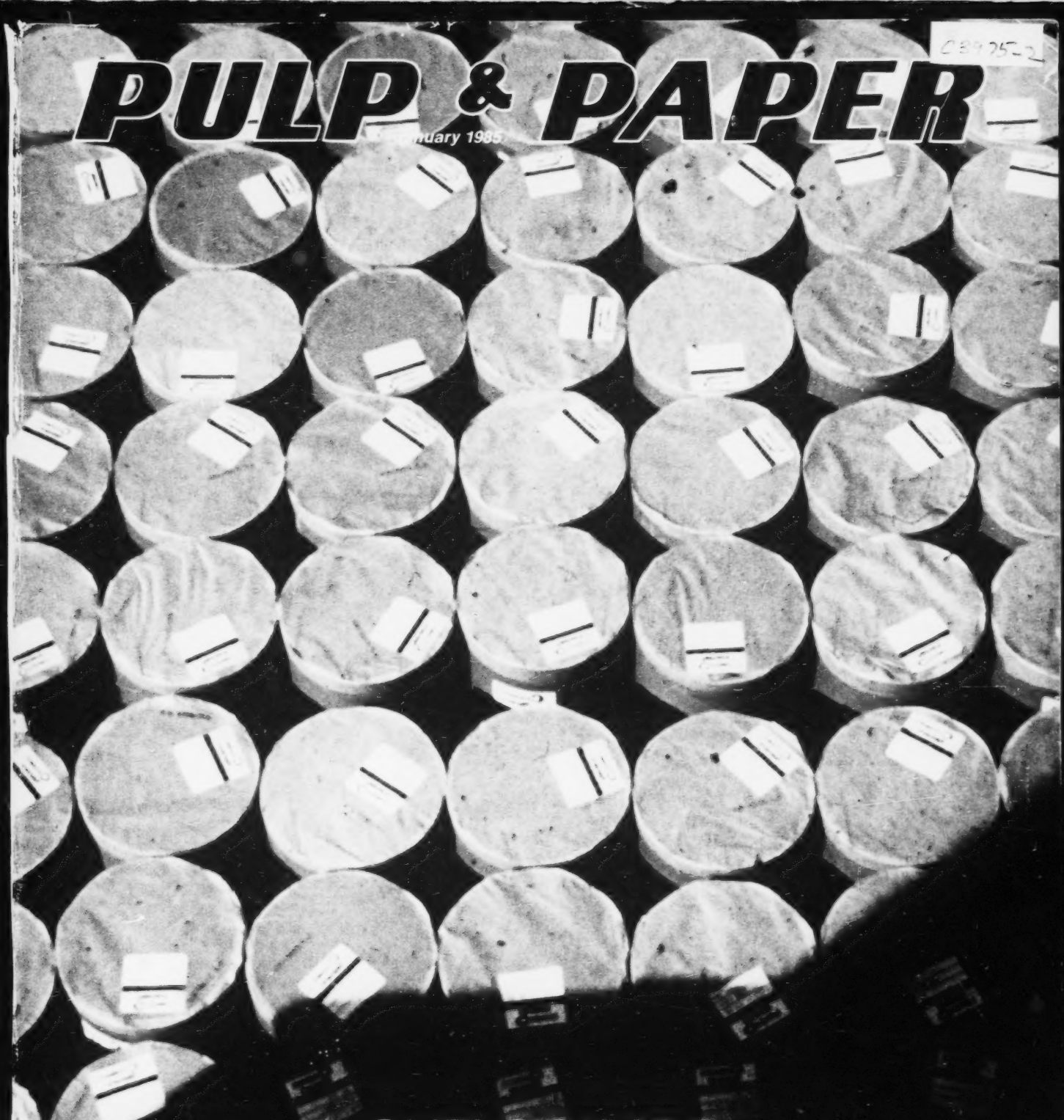
PULP & PAPER

January 1985



OUTLOOK '85

Higher paper production, profits seen—despite recent slowdown 57

CAPITAL SPENDING:
Paper industry is setting new records for 1984-86 spending 109

Volume 59
Number 1

JANUARY

OUTLOOK '85

Will the recovery hold? ____ 57
Despite recent weakening, the U.S. economic recovery should continue at a slower pace in 1985; moderate production growth should keep operating rates—and profits—at high levels, but uncertainties persist

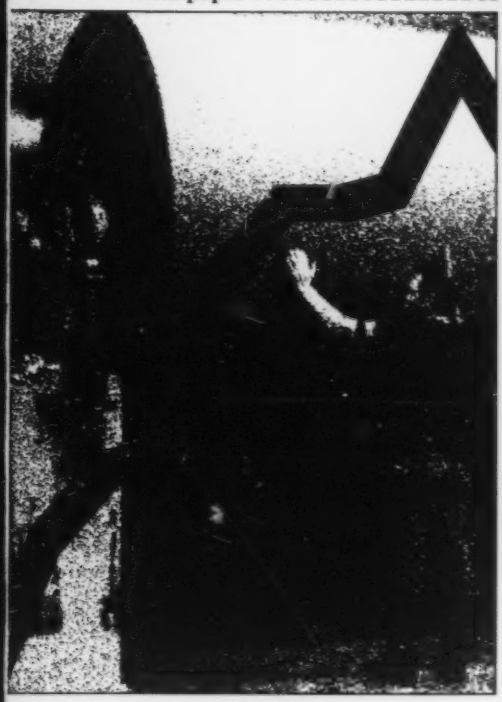
Coated paper ____ 60

Uncoated free sheet ____ 62

Containerboard ____ 63

Boxboard ____ 64

Wastepaper ____ 65



Canadian forecast ____ 66
More silver linings than clouds are ahead for troubled mills, as Canada's pulp and paper industry approaches peak operating conditions in every respect except pricing

Newsprint ____ 71

Uncoated groundwood ____ 73

Pulpwood ____ 74

Labor ____ 75
Moderation in demands and quiet negotiations will characterize 1985, with U.S. and Canadian bargaining cycles at low ebb

THE COVER

The North American pulp and paper industry should see higher production and profits in 1985 if the economy stays on course and inventory correction is maintained. **(Photo courtesy of Crown Zellerbach Corp.)**

CAPITAL SPENDING

***P&P*'s annual survey** ____ 109
Strong demand, high operating rates, and improved earnings encouraged U.S papermakers to boost spending plans to new highs, while Canadian firms' plans are far above depressed levels of past few years

OTHER FEATURE

PAPERMAKING

Press sections/felts ____ 78
New designs yield even drier, stronger sheets, dramatically improve operating performance

Older machine rebuilds ____ 90
For older, smaller paper machines, key ingredients are careful planning and evaluation of impact on process

Opco pulping ____ 96
First system in commercial operation at Canadian mill produces quality replacement for chemical pulp in newsprint

In year 2000 ____ 130
Interview with two paper machine design experts targets expected trends, developments in next 15 years

WATER QUALITY

A North American first ____ 94
Wet oxidation sludge incineration system at Midtec mill generates 30-psi steam, recovers filler clay

MANAGEMENT

API capacity survey ____ 117
U.S. paper industry to lift capacity by 1.6%/year over next three years; 1984 spending plans revised upward by 784,000 tons in most recent survey

Japanese methods ____ 132
Japanese-style statistical methods help operators at Federal Paper Board's Riegelwood, N.C., mill identify process problems

Budworm update ____ 136

Budworm-inflicted damage to forests in northeastern U.S. and Canada slowed in 1984, but the 13-year battle with the pest is far from over

EDITORIAL STAFF

Editor	Ken L. Patrick	AT
Executive Editor	Kenneth E. Smith	AT
Executive News Editor	Willard E. Mies	SF
Senior Editor	John C.W. Evans	NY
Associate Editor	Dave R. Allan	NY
Engineering Editor	Matt Coleman	AT
Senior News Editor	Debra A. Adams	NY
Technical Editor	Michael J. Ducey	SF
News Editor	Carl P. Espe	SF
Assistant News Editor	Lynn D. Rohrer	SF
Consulting Editor	Stephanie Pollitzer	SF
Departments Editor	Susan Taylor	AT
Staff Editor	Maude Conrad	SF
International Editors	John Kalish	BR
	Peter Sutton	BR
	John Pearson	BR
Managing Editor	Paula J. Irons	SF
Art Director	Ellen Zaslow	SF
Copy/Production Editor	Deborah S. Sollosi	SF
Copy/Production Editor	Regina M. McGrath	SF
Technical Artist	Janet Duncan	SF

Office locations

AT – Atlanta: 2700 Cumberland Parkway N.W., Suite 530, Atlanta, Ga. 30339; (404) 432-3186; Telex 275015
SF – San Francisco: 500 Howard St., San Francisco, Calif. 94105; (415) 397-1381; Telex 278273
NY – New York: 370 Lexington Ave., New York, N.Y. 10017; (212) 683-9294; Telex 220442
BR – Brussels: Chaussée de Charleroi 123a, Boite 5, B-1060, Brussels, Belgium; Telex 846-24672

PUBLISHING HEADQUARTERS
San Francisco, California

Publishing Director	Leigh M. Freeman
Group Publisher	Leonard E. Haas
Director of Production	Andrew A. Mickus
Director of Circulation	Wini D. Ragus
Ad Production Coordinator	Mary Marrkand
Marketing Coordinator	Dana Baker
Statistical Assistant	Kimberly M. Johnson

Sales and business offices are listed on Advertisers' Index page

MILLER FREEMAN publications

Chairman of the Board ..... Miller Freeman
President ..... Marshall W. Freeman
Vice President ..... Charles C. Beake
Vice President ..... Leigh M. Freeman
Vice President ..... Leonard E. Haas
Vice President ..... Barbara M. Hampson
Vice President ..... Thomas L. Kemp
Vice President ..... Wini D. Ragus
Secretary/Treasurer ..... Miller Freeman III
Assistant Treasurer ..... Douglas M. Denny

PULP & PAPER (ISSN 0033-4081) is published monthly except November when semimonthly by MILLER FREEMAN PUBLICATIONS, 500 Howard St., San Francisco, Calif. 94105. Second class postage paid at San Francisco and at additional mailing office.
POSTMASTER: Please send Form 3579 to PULP & PAPER, 500 Howard St., San Francisco, Calif. 94105.

© Copyright 1985 by Miller Freeman Publications Inc. All rights reserved.

ABP BPA

Subscriptions & Address Change: Sent without charge in the U.S.A. & Canada (upon written request) to individuals in pulp, paper, and board manufacturing firms and paper converting firms. To all others there is a subscription charge of $45.00 a year in the U.S. All subscriptions to other countries: $65.00 a year, except Europe and Mediterranean, $75.00 (air service included). Single copy, $4.00, except Buyers Guide, $25.00. Photocopies of articles and complete microform volumes available through University Microfilms International, 300 N. Zeeb Rd., Ann Arbor, Mich. 48106.
Requests, subscription orders, and address changes must show name and position or job of individual, name and location of mill, plant or office where employed, and exact business or product produced at this location.
Send subscription correspondence to:
Circulation Department, PULP & PAPER,
500 Howard St., San Francisco, Calif. 94105.
For address change, include label from recent issue.

JANUARY

NEWS

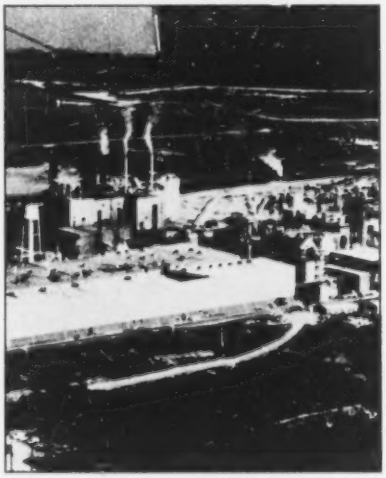
Month in Statistics 9
U.S. paper and paperboard production data for October 1984

Market Report 11
Market pulp prices down in Europe
Tissue mills try increases again
Europe rejects fall linerboard hike

Grade Profile 13
Linerboard: limited growth should keep operating rates high

NEWS SCAN

Federal buys Continental mill ... 23



Federal's new mill

St. Regis/Champion merger on ... 23
Washington news mill planned ... 25
Crestbrook okays kraft expansion ... 25
O-I to add medium capacity ... 25
Reed expansion gets boost ... 27
Quinnesec to get new machine ... 29
Dunn to expand Port Huron mill ... 29
CCA to fold Texas carton plant ... 29
Mead's new color imaging process ... 31
K-C to move headquarters ... 31
New era for newsprint ... 33
Antioch strikers approve contract ... 35
IP Gardiner, Ore., workers return ... 35
Big Seven firms hint at cost cuts ... 37
Madison raises SC price ... 39
Wastepaper slide slows ... 39

International News 41
Soviet mill to add CTMP plant
Mexican mill increasing kraft capacity
Newsprint upgrades in Sweden, U.K.

COLUMNS

From the Editors 7
by Ken Patrick
Tell me it's not so, dean

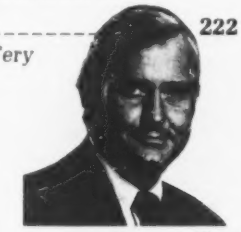
Washington Viewpoint 43
by Luke Popovich
The Hindenberg burns again

Career Development 153
by Roberta Bhasin
Better communications through meetings

Engineer to Engineer 163
by Matt Coleman
Engineers state views on personal computers

Chemical Markets 207
by Barry Shocket
TiO_2 demand continues to rise

Comment 222
by John B. Fery
On the road to recovery



Fery

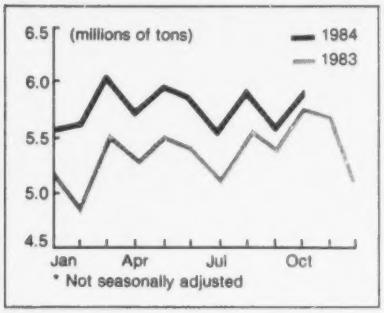
DEPARTMENTS

Conference Calendar 45
News of People 155
Product Showcase 175
New Products 177
Product Review 193
Literature 197
Bookshelf 203
Finishing/Converting 205
Supplier News 208

SERVICES

Company Index 165
Reader Service Index 167
Reader Service Card 169
Jobs Wanted 211
Professional Service Directory 212
Classified Advertising 214
Advertisers Index 220

U.S. paper and board production, 1984/83



October production of U.S. paper and paperboard reached 5.9 million tons, an increase of 1.5% over October 1983 which brings the year-to-date production total to 69.7 million tons, a 7.0% increase over the same period a year ago. If production remains at November levels (based on weekly data) during December, the 1984 total would be about 69 million tons, with paper just over 34.5 million tons and paperboard a little short of that level, according to American Paper Institute. These totals indicate a 5% gain for paper and a 6.5% jump for paperboard over their respective 1983 record highs.

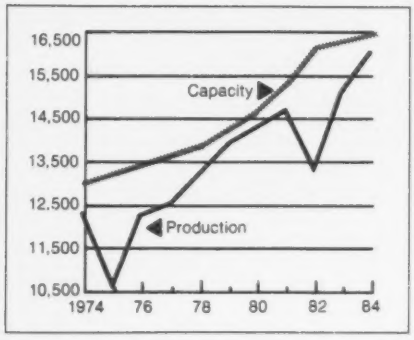
Among major grades, coated paper leads ten-month totals with a 10.5% increase over the same period in 1983, although its pace slackened during October to a 3.8% margin over October 1983 levels. Bleached paperboard was the only major grade to dip below last October's production totals.

Canadian newsprint shipments in October hit 792,000 metric tons, a 3.7% increase over October 1983, according to the Canadian Pulp & Paper Assn. October newsprint mill operating rates were 93%. ■

	Latest month (000 short tons)		% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION [1]					
Newsprint	Oct.	474	5.8	5,585	8.2
Uncoated groundwood (s)	Oct.	140	1.4	1,587	4.8
Coated paper (s)	Oct.	547	3.8	6,228	10.5
Uncoated free sheet (s)	Oct.	800	4.3	9,239	5.8
Other printing/writing	Oct.	123	−4.7	1,471	2.1
Total packaging and other paper (s)	Oct.	480	−5.3	5,844	3.8
Tissue	Oct.	425	1.2	4,880	1.9
Total paper	**Oct.**	**2,988**	**1.7**	**34,844**	**6.0**
Unbleached kraft paperboard	Oct.	1,457	1.2	17,480	8.1
Semichemical medium	Oct.	440	4.0	5,231	11.0
Bleached paperboard	Oct.	346	−0.6	4,113	4.5
Recycled paperboard	Oct.	683	0.7	8,043	8.4
Total paperboard	**Oct.**	**2,926**	**1.3**	**34,868**	**8.0**
Total U.S. paper and paperboard output	**Oct.**	**5,914**	**1.5**	**69,711**	**7.0**
PULP, WASTEPAPER & FIBER [2]					
Total U.S. woodpulp production	Sept.	4,551	3.0	55,907	7.2
Market pulp production	Sept.	547	2.6	6,782	5.5
Wastepaper consumption at paper/board mills	Sept.	1,283	8.0	15,863	10.5
Pulpwood consumption (cords)	Sept.	7,246	0.6	87,991	3.3
CONVERTED PRODUCTS STATISTICS [3]					
Corrugated box shipments (billion ft²)	Oct.	24.852	5.5	226.524†	5.5
Containerboard inventories at U.S. box plants and mills	Oct. 1	2,702	15.5		
INTERNATIONAL TRADE [2]					
U.S. paper imports (including products)	Sept.	970	30.9	11,151	28.2
Imports of Canadian newsprint	Sept.	647	20.5	7,699†	15.3
U.S. paper exports (including products)	Sept.	399	3.1	4,555	−1.2
Exports of unbleached kraft linerboard	Oct.	149	−5.4	2,107	−9.5
Exports of woodpulp	Sept.	285	−15.4	3,632	1.1
Norscan producer chemical paper market pulp stocks	Oct.	1,494	−0.6		
Average Norscan market pulp mill operating rate	Oct.	101%	86.6%	93%	87.7%
CANADIAN STATISTICS [4] *(reported in metric tons)*					
Total newsprint shipments	Oct.	792	3.7	7,483†	7.7
Operating rates	Oct.	93%	88%	92%	84%
Inventories held by U.S. consumers	Oct.	1,013	1,001		
Other paper/board shipments	Oct.	451	0.9	4,363	8.7
Woodpulp shipments (export only)	Oct.	272	1.9	2,673†	8.8
Operating rates	Oct.	97%	88%	86%	85%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fiber Box Assn., Paperboard Packaging Council. 4. Canadian Pulp & Paper Assn. †Not annualized. ‡Not directly comparable to year ago because of coding change. (s) = shipments.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

	1983	1984	1985e
Production	15,001	15,960	16,315
Capacity	16,217	16,488	16,723
Utilization rate	92.5%	96.8%	97.6%
Imports[1]	48	70	50
Exports[2]	2,281	2,100	2,247
Apparent U.S. consumption	12,768	13,930	14,118
Lb/capita	109.0	118.2	118.5
GNP ratio	8.32	8.47	8.42

1. Commerce Dept.
2. American Paper Institute (production for export).
e = *P&P* estimate.

TOP U.S. PRODUCERS (000 tpy)

	Annual capacity	Market share (%)
1. International Paper	1,580	9.4
2. Weyerhaeuser	1,370	8.2
3. Stone Container	1,345	8.0
4. Union Camp	1,340	8.0
5. Champion International	1,037	6.2
6. Container Corp. of America	873	5.2
7. Owens-Illinois	720	4.3
8. Great Northern Nekoosa	710	4.3
9. Georgia-Pacific	700	4.2
10. Westvaco	660	3.9

Market share of top five companies:
16.7%

Market share of top ten companies:
39.9%

Total U.S. capacity (1985):
61.8 million short tons

LINERBOARD:
Limited growth should keep operating rates high

Grade structure:
Unbleached linerboard is made in a wide range of basis weights. Standard weight in the U.S. is 42 lb/1,000 ft², but other important weights are 26 lb, 33 lb, 69 lb, and 90 lb/1,000ft². Major use is in domestic corrugated container production, although about 13% of output is exported. About 300,000 tons of recycled "test" liner is produced in the U.S. but is excluded from these figures.

Production/capacity:
Unbleached kraft linerboard production rose strongly for a second consecutive year, reaching a new high of 15.96 million tons in 1984, up 6.4% from its 1983 level. Through the first nine months output was up 9.0%, but for the fourth quarter output is expected to be slightly below levels of a year ago as mills take downtime to reduce inventory levels.

Corrugated box shipments rose about 6.8% in 1984 to set a new record of 269.7 billion ft². This reflected a similar rise in real GNP and a 10% jump in U.S. industrial production. Linerboard output for export, however, should be down about 8%, to 2.1 million tons, reflecting the strong U.S. dollar. Inventories of containerboard at box plants and mills rose sharply during the summer months, but then began to drop and were down to 1.5 million tons by Nov. 1.

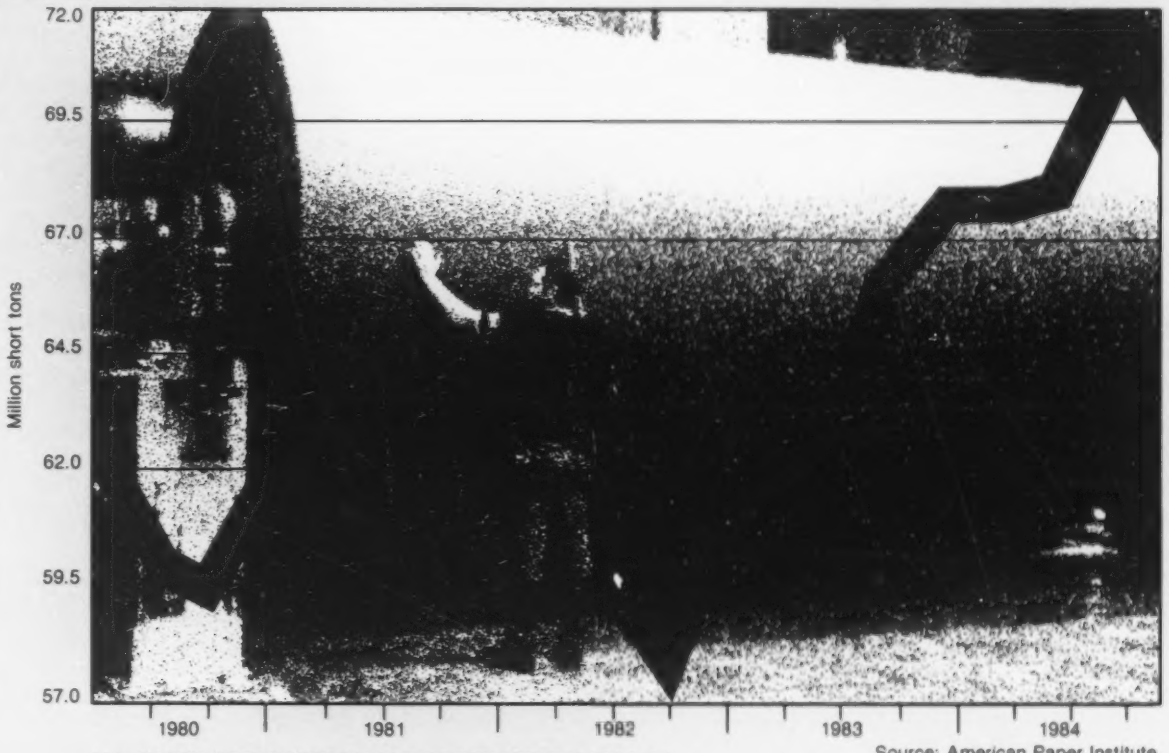
Outlook:
Corrugated box shipments in 1985 are expected to rise about 2.5% as the U.S. economy slows. Real GNP this year is expected to increase about 3% and industrial production to rise 2.8%.

Linerboard production for domestic use is expected to rise only about 1.7% because of an estimated 100,000 tpy reduction in containerboard inventories. Production for export in 1985 is forecast to rise 6% to 2.1 million tons despite the continuing strength of the dollar through the first half of the year.

This situation should result in about 2.2% growth in total linerboard demand in 1985. With capacity expected to increase by only 1.4%, linerboard operating rates should rise slightly to 97.6% in 1985 from about 96.8% in 1984. Because of recent low profitability, liner capacity is expected to rise at only a 1.1% annual rate over the entire 1985-87 period with only one new machine announced (which replaces a machine to be converted to another grade).

Pricing:
Producers were able to implement two $30/ton price increases in 1984, in February and September, bringing the price of 42-lb to $350 in the eastern U.S. If the economy strengthens this spring, producers will probably try for another increase. (Historical year-end prices for 42-lb liner delivered east of the Rockies are as follows: 1984, $350; 1983, $290; $1982, $250; 1981, $270; 1980, $270; 1979, $270; 1978, $220. For earlier years see *Pulp & Paper PriceBook*.)

A $35/metric-ton fourth-quarter price increase for northern Europe to $440 c.i.f. has been delayed by U.S. mills until Jan. 1. ■



U.S. PAPER AND PAPERBOARD PRODUCTION 1980-84

Source: American Paper Institute.

U.S. PAPER INDUSTRY RECOVERY EXPECTED TO CONTINUE IN 1985

Moderate production growth should keep operating rates at high levels and permit some increase in industry profits, but uncertainties persist

SPECIAL P&P REPORT

■ Despite some recent weakening, the U.S. economic recovery should continue at a slower pace in 1985. This will result in moderately higher production and profits for the paper industry, according to the forecasts of most industry observers.

Signs of a slowdown in the economy began to appear in the third quarter of 1984. Real GNP growth plunged to a 1.9% rate compared with a 7.1% rate in the second quarter. Industrial production leveled out and consumer spending weakened. Housing starts in October were a third below the high reached in February. And perhaps most disturbing, the trade deficit widened from a $120-billion annual rate in the second quarter to an almost $150 billion in the third, almost twice its size a year ago.

Paper industry production remained strong through the third quarter but started to weaken in the fourth quarter as some mills began to take downtime, particularly in the paperboard side of the industry. Price weakness also began to develop in uncoated free sheet and market pulp, although the discounting was more a reflection of excess capacity and the strong dollar than weakness in demand.

Clarence W. Brown of Shearson Lehman/American Express noted a "significant slackening in virtually all

Outlook '85 was prepared by Pulp & Paper news staff editors Will Mies, Dave Allan, and Debra Adams.

areas of estimated industry growth, reflecting the maturation of our nation's economic recovery, coupled with persistently high interest rates, federal budget deficits, and a strong U.S. dollar."

RECESSION UNLIKELY. Nevertheless, most analysts surveyed by *Pulp & Paper* do not expect the paper industry to slide into a full-blown recession. Their optimism stems from recent actions by the Federal Reserve to reduce interest rates, plus the likelihood that financially flush consumers will step up spending soon. "Consumers can only save and hold back on borrowing so long before they get restless," noted Norma Pace, senior vice president of the American Paper Institute.

Slower economic growth and the Fed's credit loosening moves caused interest rates, as measured by the prime rate, to drop to 11.25% in early December from around 13% last summer. The decline in rates should spur such interest-sensitive segments of the economy as housing and automobiles. Another positive development has been the gradual weakening of the dollar from its peak reached last fall. "This will reduce the drag of the trade deficit on the economy," commented Bruce Kirk of Goldman Sachs.

SPRING PICKUP. Most analysts expect the economy to pick up in early spring after the current inventory correction has been completed. Pace expects real GNP growth in 1985 to increase 3.1% and industrial production to rise 4%. This is fairly close to the consensus of Wall Street security analysts surveyed by *Pulp & Paper*, who look for a 3.3% rise in real GNP this year after last year's roughly 6.5% jump.

Pace said she expects interest rates as measured by the prime to decline a bit further this year to around 10% to 10.5%. And rates should remain fairly stable "because there won't be that kind of credit demand pressure." Some forecasts, however, are less optimistic. Morgan Stanley, for example, expects interest rates to rise later in the year as the economy picks up strength and the Federal Reserve again pulls in the credit reins, according to analyst Thomas P. Clephane.

U.S. paper industry production should rise around 3% in 1985, with paper showing a smaller gain than paperboard, according to Pace. The consensus of analysts is that total paper industry production will rise 2.8% in 1985 from last year's level of about 69 million tons. Production in 1984 was up about 5.9%, following a 9.5% jump in 1983 from the recession low in 1982.

U.S. exports of paper and paperboard may show a modest rise in 1985 after declining 2% in 1984 due to the strong U.S. dollar and slower economic growth in other countries. Pace expects linerboard exports, which declined about 4% to 5% in 1984, to increase moderately, aided by further weakening of the dollar.

Imports of paper and paperboard into the U.S. may level off or decline after jumping about 28% in 1984. "Uncoated free-sheet paper imports appear to have reached the high-water mark and should begin to decline," according to H.C. Bowen Smith of Salomon Brothers. Such imports were running at a 500,000-tpy annual rate through the first nine months of 1984, nearly three times their comparable year-earlier level.

MIXED GRADE OUTLOOK. Operating rates for U.S. paper mills will rise to about 95.8% in 1985 from about

WHAT THE ANALYSTS ARE PROJECTING FOR 1985.

	Percentage change from 1984 levels (unless otherwise indicated)								
	Growth in real GNP	Paper/board production	Operating rates[1] Paper	Operating rates[1] Paperboard	Prices	Costs per unit output	Operating profits Paper	Operating profits Forest prod.	Housing starts[2]
Mark S. Rogers Dean Witter	+3.6%	+3.2%	97.2%	98.6%	+12.5%	+4.6%	+49%	+64%	1.7 mill.
William Wigder First Manhattan	+2.8	+3.2	97	98	+4.0	+2.0	+15	+100	1.65
Bruce Kirk Goldman Sachs	+3.5	+3 to +3.5	95	96	+6.5	+4 to +4.5	+15	+30	1.8
Evadna S. Lynn Merrill Lynch	+3.2	+1.2	95.3	95.9	+6.2	+5.2	+31	+32	1.65
T. Clephane/J. Carroll Morgan Stanley	+2.9	+1.6	94.4	95.1	+5.2	+3.7	+14	+7	1.65
Lawrence Ross Paine Webber	+3.3	+3.5	97	95	+6 to +7	+3 to +4	+25 to +35	+25 to +35	1.7
H.C. Bowen Smith Salomon Brothers	+4.0	+3 to +5	95.5	96.5	+3 to +7	+3 to +4	+25 to +30	−10	1.75
Clarence W. Brown Shearson Lehman	+3.0	+2.5	95	95	+4.0	+4.0	+10	+20	1.6
George Adler Smith Barney	+3.3	+3.0	95.4	96.5	+8.0	+4.0	+15	+18	1.7
Average	+3.3	+2.8	95.8	96.3	+6.4	+3.9	+23.2	+32.3	1.7

1. Production as percent of capacity.
2. Millions of units.

94.7% last year, while rates for paperboard mills increase to 96.3% from 95%, according to the consensus of analysts. The improvement in operating rates reflects both the moderate growth in production and the slow rate of industry capacity growth. The latest American Paper Institute survey shows capacity for paper rising 1.2% and paperboard rising 1.4% in 1985.

Prospects for individual grade segments will vary significantly, however, mainly depending on the rate of capacity expansion taking place. Clephane estimates operating rates in 1985 will be 97.5% for coated paper, 98% for newsprint, 99.2% for unbleached kraft paper, and 96.5% for linerboard.

But he sees uncoated free sheet averaging only 89.6%, reflecting substantial capacity being added in this grade. The high operating rate for unbleached kraft paper, despite declining demand, reflects a number of machines being shifted to other grades. Evadna Lynn of Merrill Lynch also sees relatively high operating rates in 1985 for semichemical medium at 97.5%, bleached board at 96%, and tissue at 94.9%.

HOLDING BACK PRICES. Even though the paper industry will be operating near full capacity in 1985, "prices are not likely to accelerate as rapidly as in previous periods of comparably tight operating rates," according to Lynn. Among the reasons she cited are: the strength of the dollar, which is encouraging low-priced imports and hurting export demand; the low-inflation economic environment and lack of cost-push pressure; and the effect of accelerating incremental expansion as industry cash flow rises.

On average, analysts look for about a 6.4% advance in paper and board prices in 1985, following about an 11% increase in 1984. Market pulp prices, which have slid about 10% since last summer, are also causing some uncertainty. "Price weakness in pulp is infectious and will spread quickly to other paper products," noted Smith.

Nevertheless, George Adler of Smith Barney, Harris Upham remains fairly optimistic about most industry segments. "We expect linerboard prices and box prices to firm again next spring and feel that coated grades also will improve by another notch. Even the more depressed uncoated business paper and pulp markets may firm by the second half of this year, and the same may be true of market pulp." An apparent change in strategy by Procter & Gamble to emphasize profitability rather than market share gains may also help pricing in the tissue segment, he noted.

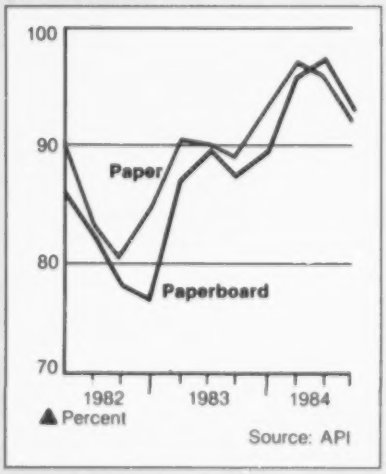
Costs per unit of output are expected to rise about 4% this year, up from about a 2% to 3% rate of increase in 1984. Most second-year increases for labor agreements negotiated last year in the East appear to have been around 5% to 6%, and improved productivity should keep the growth in unit labor costs down. Energy costs should also rise slowly, with some possible further weakening in oil prices and improvement in the paper industry's energy efficiency. Pulpwood prices in the South rose about 4% last year (with some regional variations) and will probably not rise much faster this year.

PROFITS TO RISE. With prices outpacing costs, and moderate production growth, U.S. paper company operating profits may rise by about 23% in 1985, according to the consensus view. Estimates range from about a 10% increase projected by Brown to a 49% increase seen by Mark Rogers of Dean Witter Reynolds.

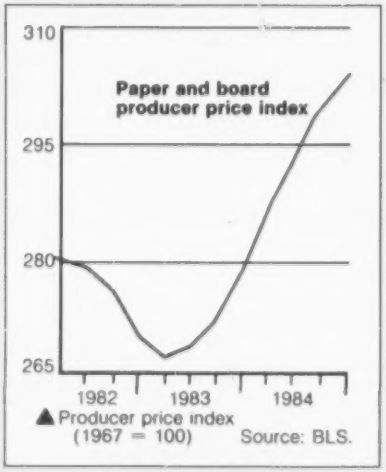
The recent decline in interest rates has caused most forecasters to raise their projections for housing starts in 1985. Salomon Brothers, for example, has raised its estimate for 1985 housing starts from 1.5 to 1.6 million units to 1.70 to 1.75 million units, according to Smith. He says, "In 1985 the key factor in the performance of wood products operations will be the level of wood imports from Canada."

A flood of Canadian lumber imports, overcapacity in both lumber and plywood, and weak wood product exports depressed the U.S. wood products industry last

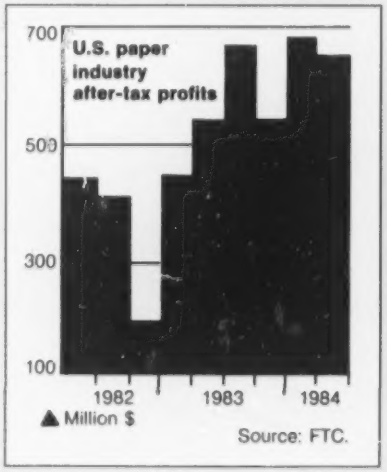
U.S. PAPER/BOARD OPERATING RATES ROSE . . .



. . . WHILE PRICES FOR MOST GRADES CLIMBED IN 1984 . . .



. . . CAUSING PROFITS TO STAGE A PARTIAL RECOVERY



year. The consensus of the analysts is that the operating income for forest products companies will rise about 32% in 1985. The blurring distinction between paper and forest products companies, however, is causing some confusion in the results of the *P&P* survey, with some analysts basing their estimates on just the wood products divisions of forest products companies, and others basing their's on entire companies, which would include some contribution from paper divisions.

Lawrence Ross of Paine Webber Mitchell Hutchins, for example, estimates that income for paper/forest products companies will be up 25% to 35% this year, but that profits from their wood products divisions will be flat, following a 20% to 40% decline last year.

More optimistic is William Wigder of First Boston, who believes enactment of a timber relief bill last year "will have a far-reaching positive effect on the lumber and plywood industry." The legislation will reduce an enormous potential liability that would have retarded profits for at least five years until the timber was cut. It will also result in the closure of obsolete capacity and may keep stumpage prices in the Pacific Northwest from falling further. He expects profits from wood products operations to jump more than 100% this year.

LONG-RUN OUTLOOK. Prospects for the paper industry in 1986 are more unclear, with some forecasts predicting a recession and others a period of slow growth. Most analysts with paper industry forecasts for next year expect growth in the 2% range, which is enough to keep operating rates in the high 96% to 97% range, given the continued slow rate of capacity growth.

One factor that could influence the long-run rate of industry capacity expansion is the tax plan proposed by the Treasury Dept. "Our initial view of the proposed tax legislation is that it would take away a substantial amount of the economic incentive for building a greenfield plant that has been provided by accelerated depreciation and the investment tax credit," Clephane noted. This could slow the rate of capacity growth and "tilt the balance toward acquiring existing facilities rather than going into major new projects. The end of timber capital gains is also going to increase the uncertainty on the part of many companies in holding timber properties."

Pace, however, pointed out that the tax changes in accelerated depreciation could give a very short-term boost to capital spending. If projects already being built are "grandfathered" (allowed to use present liberal depreciation schedules rather than the new, more restrictive rules), many companies may try to rush ahead on projects to qualify under the old rules.

Communication & Information Services (CIS), a Walnut Creek, Calif.-based firm, projects U.S. paper and paperboard consumption will grow at a 2.2% annual rate during the 1986-95 period, compared with a 3.9% rate during the 1976-85 period, and a 2.4% annual rate for the 1970-84 period.

Demand for paper grades will be substantially lower than in the last decade due to poor growth for kraft paper and slower growth for tissue grades, according to CIS. Demand for printing and business papers will continue to be high, increasing at a 3.5% annual rate through 1995. Paperboard demand will also remain healthy over the next decade, increasing at a 2.1% annual rate. "The outlook for market pulp in the U.S., however, is not encouraging," the CIS report said. "Domestic demand for paper-grade market pulp will increase by less than 1% annually."

COATED PAPER

Another great year ahead

At this time last year, it looked like coated paper mills would operate full-out through 1984. Looking ahead to 1985, it appears that prediction will hold true for the new year as well. In fact, it now seems that the only thing that could depress coated paper before the next round of capacity gets fully up to speed in 1987-88 is a recession.

In September, a Morgan Stanley & Co. research report on Consolidated Papers Inc. forecast that the U.S. coated paper industry would run at 101% in 1985 after racking up a virtually identical performance in 1984. Paper industry executives feel that prediction is still good.

Some worry that the economy could slow down in late 1985, but many feel that even a modest slowdown this year wouldn't drop coated paper operating rates below the mid-90s. Furthermore, the recovery in Europe is leading overseas suppliers to scale back their plans for shipments to the U.S., albeit modestly. No growth in coated paper imports this year—from 1984's already record level—is likely.

A further note about imports of both coated groundwood and coated free sheet: big though the volumes of such grades have been in the last year, they have not undermined U.S. pricing because paper continues to be very tight. Indeed, they tend to be priced 15% or more above domestic quotes, whereas in soft markets like uncoated free sheet the domestic mills have to fight off seriously discounted imports.

What that means for the mills is a return to historic profit levels as prices continue to rise faster than the consumer price index. It is not clear how far prices will jump this year. Some observers worry that (in the words of one observer) mills are in danger of "killing the goose that lays the golden eggs" by raising prices so fast that it hurts the competitiveness of print advertising media.

While there is disagreement about the continued viability of the print media in an environment of rising paper prices, there is no question about the volume of demand for paper. American Paper Institute figures show total coated paper output running at a better than 6.2-million-short-ton rate in 1984, which implies an operating rate of more than 97%. Operating rate figures are, in fact, subject to differing definitions, but it is accurate to say that coated groundwood and coated free-sheet mills in the U.S. ran full-out in 1984.

Imports of coated paper totaled more than 400,000 tons in 1984. The rate actually rose as the year went on,

reaching a new high in July. By comparison, imports in 1983 totaled just 162,000 tons. The large majority of both years' figures—probably better than 90%—was coated groundwood.

Little added capacity is expected in coated groundwood or coated free sheet in 1985. There was some unexpected "sponge" effect on 1984 capacity, raising capacity by 320,000 tons over what the American Paper Institute had originally expected it to be for the year. This effect occurs when mills find ways to increase capacity through modifications in production, optimized grade mix, etc. But even the sponge effect did not bring on enough new coated paper capacity to satisfy customers' needs.

COATED GROUNDWOOD. Coated groundwood shipments totaled more than 3.6 million tons in 1984. U.S. coated groundwood capacity is expected by the American Paper Institute to grow by just 43,000 tons in 1985, leaving room for virtually no year-over-year increases in production.

Anyone who looks solely at year-over-year figures in 1985 would be inclined to think that coated groundwood mills were having an off year. Coated groundwood shipments are expected to rise just 4% in 1985, perhaps a third of the growth rate of each of the last two years.

But consumers have essentially nowhere else to go for paper, given that imports are not expected to rise and supercalendered uncoated groundwood (SC) paper supplies are as constrained as coated. Some consumers will necessarily use lower grades of uncoated groundwood, or will shift to uncoated free-sheet offset or the sometimes-more-available heavier weight coated groundwood. But they will always shift back to the preferred grade if they can.

This means customers should have little ability to resist price increases. But there was comment among executives and other observers in late 1984 that two price increases in 1985 might hurt the competitiveness of magazines, inserts, and flyers.

Consolidated Papers Inc. may have been responding to these fears when it announced a January 1985 price increase of 5%, compared with previous predictions that prices would go up 6% to 8%. During the same week, St. Regis Corp. announced its new price list, raising quotes by 6%. Morgan Stanley & Co. analyst, Jeanne Carroll, projected an average increase of 8.8% in coated paper prices in 1985 and 7% in 1986. One papermaker had earlier predicted a 14% price rise for the year, in two stages—something that raised the ire of magazine publishers when it was mentioned. Paper industry executives argue, on the other hand, that they need higher prices to justify the necessary capacity expansions to continue serving a growing market.

Even the prospect of two 5% to 6% hikes in the year made publishers fume, although they admit they have no place else to go if the paper industry decides to raise prices again in 1985. But one U.S. mill executive pointed out that some large printers are likely to continue buying some imported paper, even when U.S. capacity rises in 1986-88, simply to keep their options open. And with 900,000 metric tons of new European lightweight coated capacity coming onstream between now and 1988, they may be able to exercise considerable leverage with U.S. suppliers by continuing to buy overseas.

In the meantime, publishers have only the most minimal inventories. Due to seasonally low consumption, they were able to begin building stocks slightly at the end of 1984. Some also put paper into inventory earlier in the fall when the considerable import volumes of the summer came in. Much of that imported paper reportedly arrived late and thus ended up in inventory rather than going onto the printing press.

But publishers continued to pay for truck deliveries from the mill, indicating their stocks are minimal at best. And seasonal trends in the early months of 1985 will make further inventory accumulation impossible before the summer.

Consumers won't get any respite from new capacity in 1985 or 1986. The only significant new capacity definitely scheduled to come online before the end of 1986 are a new 190,000-short-tpy machine being built by Repap (parent of Midtec Paper Corp.) in New Brunswick (scheduled startup in the first quarter of 1986), and a 200,000-tpy unit being started up by Bowater Inc. in South Carolina in the second half of 1986. However, the two machines together won't produce much more than 100,000 tons of paper in 1986, and they won't be operating at capacity until 1988 or 1989.

Kruger Inc. is expected to start up a new coater at Trois Rivieres, Que., some time in 1986, adding 77,000 short tpy of capacity. But the market probably won't see much more than half of that added production in 1986.

Finally, Repap's Nitec Paper Corp. mill in Niagara Falls, N.Y., may be restarted in 1985, adding 80,000 tpy of capacity. But nobody is yet counting on the likeli-

GROWTH TRENDS IN U.S. CAPACITY.

Grades	Additions 1975-1984 Ten year increase	Additions 1975-1984 Average annual growth (%)	Additions 1985-1987 Three year increase	Additions 1985-1987 Average annual growth (%)
Total paper & paperboard	13,222	2.0	3,568	1.6
Total paper	8,319	2.6	2,283	2.0
Newsprint	2,125	1.7	(55)	(0.3)
Printing/writing	5,642	3.4	2,183	3.6
Packaging & industrial converters	(369)	(0.6)	(222)	(1.3)
Tissue	921	2.0	377	2.3
Total paperboard	4,903	1.5	1,285	1.2
Unbleached kraft	3,825	2.5	572	1.1
Solid bleached	266	0.7	252	2.0
Semichemical	789	2.2	174	1.1
Recycled	22	—	287	1.1
Total wood pulp	10,002	1.9	2,460	1.4
Dissolving & special alpha	(320)	(1.9)	—	—
Sulfite	(675)	(3.2)	(2)	—
Sulfate & soda*	8,678	2.3	2,186	1.7
Semichemical	336	0.8	85	0.6
Mechanical	1,982	4.0	191	1.0

*Includes screenings. ( ) = loss.
Source: American Paper Institute.

hood, the timing, or the amount of that development.

All told, it is unlikely that North American capacity will rise by more than 300,000 tons between 1984 and the end of 1986. The likely growth in U.S. consumption should be more than that, while imports probably won't rise above present levels during that period. The outlook for coated groundwood through the end of 1986, barring a recession, is for a continued sold-out market.

COATED FREE SHEET. The outlook for coated free sheet isn't much different. This grade family is more seasonal than coated groundwood, allowing customers to occasionally build a little inventory. But mills operated full-out through 1984 and will do the same in 1986. Capacity will go up by 145,000 tons in 1985, but this will do little more than help the industry keep its existing customers satisfied.

Some publishers and printers may upgrade to free sheet because they can't get groundwood. But aside from recently started machines moving up the learning curve plus some improvements on existing machines—such as a 32,000-ton increase at Consolidated in late 1984 and early 1985, brought about by a rebuild of a coated free-sheet machine and a coated one-side machine—there isn't a lot of room for mills to accommodate new business.

Imports don't play the role in coated free sheet that they do in coated groundwood, although some high-quality European paper certainly has come in to the U.S. in the last couple of years. A few U.S. mills have even added "super-premium" No. 1 grades to meet competition from the best of the imports, but these products represent a small volume of business.

The general perception among observers of the industry is that advertisers continue to demand improved quality in the printed product, which will help coated free-sheet mills this year. Indeed, in 1984 coated free sheet grew faster than coated groundwood, with huge increases in shipments especially to free sheet's biggest market: commercial printers.

While inserts, flyers, premium magazines, and other coated free-sheet end uses are expected to continue growing considerably faster than the U.S. economy, mill executives worry that these markets may be maturing, eventually bringing growth rates down to the level of some other sectors.

In the short term, most papermakers are more worried about how to get the maximum possible production out of their machines. And they are trying to figure out how far they can expect prices to go up this year.

Mills raised prices about 5% in November and December after originally announcing the hikes for Oct. 1. The postponement was not caused by a soft market. In fact, with the annual report season in full swing, the fall and winter are the busy season for coated free sheet. Rather, the delay seems to have been caused by lack of support for an increase by one or two major mills.

With markets expected to remain tight through 1985, it seems likely prices will rise faster than the consumer price index. But it is not yet clear how soon mills will try for a 1985 increase.

UNCOATED FREE SHEET

Spotty performance continues

Cold water got thrown in the face of over-enthusiastic uncoated free-sheet producers in 1984. Once reality set in, many began to realize they could be in for a long period of mediocre news.

Late last year many would have been happy to hear even mediocre news. Prices rose so fast in 1983 that many observers believe the industry got carried away and tried to hike its quotes one too many times.

When a price increase that had been planned for July 1984 had to be canceled, pricing began to fall apart. By the end of 1984, transaction prices were down near the levels of the summer of 1983. Prices hadn't yet fallen as low as the recession depths reached in mid-1982, and it seemed unlikely that would happen. But some observers did feel quotes would drop a little more early this year before leveling out.

Unfortunately for North American uncoated free-sheet mills, there may not be any improvement before the end of the year, or beyond. Overcapacity and a flood of imports have crippled domestic pricing, and no industry executives will confidently predict when either situation will correct itself.

One New York security analyst spoke with senior executives at three U.S. companies within the space of a week in December 1984. Asking each executive when the market might turn up, he got three different answers: by the end of 1985, by the end of 1986, and "we don't know." The analyst himself tended to agree with the third assessment.

COMPUTER PRINTERS. Things may turn out better than anybody expects. For example, uncoated free-sheet shipments in 1983 rose about 11%, while copy paper shipments were up a whopping 18%. With cut-size paper high on every big uncoated free-sheet manufacturer's priority list, copy paper is obviously a key to the health of the industry.

Unfortunately, copy paper rose only about a third as fast in 1984 as in 1983. But a takeoff in small, inexpensive computer printers could clearly give the paper industry enough of a boost to absorb much of the new capacity being started up in the next few years.

However, the burst in computer printers that may rescue paper mills just isn't going to happen this year. Total uncoated free-sheet shipments in 1984 jumped a healthy 5.8% (the annual rate through October). But with capacity having jumped 7.8% in 1984, that only translates into an operating rate of about 91.5%. Most observers believe the 1985 operating rate will be no higher due to a 4.7% rise in capacity this year. It seems unlikely that consumption will rise more than 3% to 4% in 1985, although shipments could go up a bit faster as imports drift slightly lower.

The reason net imports may finish this year slightly below 1984's unprecedented 440,000-ton level is that U.S. prices have gotten so low—under pressure from

cut-rate imports—that there doesn't seem to be much room for further declines. So some executives speculate that with European demand rising and the dollar falling (they hope), and with customers preferring to avoid imports—due to unreliable shipping schedules and the difficulty of getting quality problems straightened out—consumers may drop their plans to buy from abroad.

Also on the positive side, tight conditions in coated publication and advertising grades may lead some insert and flyer printers—and even magazine publishers—to use uncoated free sheet from time to time. Uncoated free-sheet roll offset was available at bargain-basement prices in late 1984: typically $600/ton or a little less for 50-lb paper, with occasional spot deals available as low as $540. Customers may decide that with coated paper unavailable at any price, cheap uncoated free sheet is a deal. This is not expected to move huge volumes to uncoated paper, however.

But it should be remembered that commercial printers are no strangers to uncoated free sheet, in fact, they use more uncoated free-sheet paper than any other kind. In 1983, about 48% of the paper shipped to printers was uncoated free sheet, while coated paper represented about 47%. But coated paper shipments to printers have been growing about half as fast as uncoated free sheet—something that may change a little with coated paper in continued shortages.

"SPONGE" CAPACITY. Another thing that may make conditions look a little better than they now appear is connected to the appearance of a sizable "sponge" effect in 1984. As markets tightened up in 1983 and early 1984, mills found ways to stretch manufacturing capabilities. This, coupled with an optimized grade mix, enabled the industry to increase its 1984 capacity by 529,000 short tons more than the American Paper Institute had expected at the end of 1983. Now that markets are soft once again, one industry executive estimates that perhaps 200,000 tons of that improvement may disappear.

But that is a drop in the bucket compared with the capacity additions that are now being worked into the system or planned for the next five years. The American Paper Institute estimates that 1987 capacity, including only expansions that had actually been announced in late 1984, could be 1.2 million tons higher than in 1984. This does not include more than 200,000 tons of net new capacity being added between now and 1989 by Domtar Inc. in Canada, or a possible new Boise Cascade Corp. machine added by the end of the decade.

This year, the industry is trying to absorb capacity from a machine started up in 1983 at Champion International Corp.'s Courtland, Ala., mill, and machines that came onstream in 1984 at Crown Zellerbach Corp.'s Camas, Wash., facility, and Union Camp Corp.'s Eastover, S.C., mill. Also, International Paper Co. has said it will convert between 300,000 and 350,000 tpy of capacity to uncoated free sheet in 1985. In the next two or three years this capacity may be absorbed, but 1985 looks like a year of loose markets to most executives.

Furthermore, western Europe is adding 900,000 short tpy of capacity between now and 1988, leading one U.S. executive to warn that the "globalization" of the printing/writing industry means U.S. prices may be "combative" for some time. If prices stay put, he added, marginal producers may "fall by the wayside." With major producers trying to buttress prices, the smaller mills giving deep discounts may be digging their own graves. *(P&P and Gorham International will sponsor The First International Symposium on the Business Papers Market, May 1-2, at the Waldorf-Astoria, N.Y. Contact: P&P, 370 Lexington Ave., N.Y., N.Y., 10017; 212-683-9294.)*

CONTAINERBOARD

Market should be fairly tight

Limited new capacity additions make the outlook for containerboard bright in 1985, even if demand shows only modest growth, according to most industry executives and analysts.

The market for linerboard and corrugating medium began to show some softness in the second half of 1984 due to high mill production levels, slowing box cut-up rates, and weak export shipments. The most visible sign of softness was in the rise of rollstock inventories at box plants and mills from around 1.4 million tons during the first four months of the year to a peak of 2.77 million tons (7.1 weeks of supply) on Aug. 1.

INVENTORY DROP. After some difficulty, mills succeeded in pushing through a $30/ton increase that brought the eastern price of 42-lb linerboard to $350/short ton and the price of 26-lb semichemical medium to $340 in September. Some discounting persisted, however, particularly on medium, even though box producers were generally successful in pushing through about a 7% to 8% increase on corrugated box prices.

Mills have begun to bring production into better line with demand, and inventories had dropped to 2.604 million tons (6.1 weeks of supply) by Nov. 1, according to Fibre Box Assn. statistics. Inventories were expected to remain relatively stable or decline slightly through the weak final months of 1984 due to extended mill downtime announced by a number of major producers.

WEAK EXPORT SHIPMENTS. Part of the weakness in the domestic linerboard market reflected lower export shipments due to the strong U.S. dollar. The rise of the dollar over the past couple of years dramatically improved the competitive position of Scandinavian kraft liner and Continental test liner producers in Europe. Increasing supplies of board from such nontraditional producers as Brazil have also been keeping prices competitive in the European market. A move to boost U.S. liner prices in Europe by $35/metric ton last fall was unsuccessful; another attempt will probably be made soon.

Prices in Far Eastern markets have also been weak due to the strong dollar, high inventories, and increasing broker activity. The lower net on export shipments has caused mills to ship a greater amount of tonnage to the

domestic market.

For all of 1984, box shipments rose close to 7%, to around 270 billion ft², while linerboard production increased about 6.4% to nearly 16 million tons. Linerboard exports were expected to be down about 5% to 2.1 million short tons, based on Dept. of Commerce data. Semichemical medium production in 1984 totaled about 5.1 million tons, up about 8% from the previous year.

FUTURE OUTLOOK. Morgan Stanley analyst, Thomas P. Clephane, told *Pulp & Paper's* First International Unbleached Kraft Conference in New York City, Nov. 12-13, that he expected box shipments to rise only about 2% in 1985 based on real annual GNP growth of 2.8% and a 2.5% rise in industrial production. This assumes a rebound in economic growth early this year followed by one or two quarters of flat to slightly lower economic activity in the second half as interest rates rise and the Federal Reserve tries to rein in the economy.

He predicted U.S. linerboard production would rise about 1.2% in 1985, assuming about a 150,000-ton inventory drawdown and about a 5% rise in U.S. linerboard exports. With linerboard capacity expected to rise 1.4%, he predicted that operating rates would drop from 96.7% in 1984 to 96.5%—"a historically very tight level."

While Morgan Stanley's economic growth forecast for 1985 is below that of most other Wall Street firms, its forecast for 1986 is somewhat more optimistic. Clephane looks for a return to moderate economic growth next year, which would lift box shipments by about 2%. Together with a 7% rise in export shipments, this would result in a 1986 linerboard operating rate of 98.2%.

A somewhat different scenario was presented by Clark S. Johnson, executive vice president and chief operating officer of Virginia Fibre Corp., based on a forecast by Copeland Economics. He said that Copeland is projecting a 3.3% rise in box shipments in 1985, followed by a 3.5% decline in 1986 as the U.S. economy begins a major economic slowdown. Operating rates for semichemical medium are forecast to rise from 99.8% in 1984 to 101% in 1985 before dropping slightly in 1986.

SLOW CAPACITY GROWTH. Limited capacity additions are a major reason for the high operating rates in both linerboard and semichemical medium. Capacity for both unbleached kraft and semichemical board is expected to rise at only a 1.1% rate over the 1985-87 period, according to the latest American Paper Institute capacity survey. Only one new kraft linerboard machine at Chesapeake Corp.'s West Point, Va., mill is scheduled to come online, and it will replace a machine that will probably be converted to another grade. No new semichemical medium machines have been announced, although Owens-Illinois Inc. is studying a new machine which will replace some existing capacity.

Recycled containerboard could show somewhat more rapid growth with Temple-Inland scheduled to start up its 175,000-tpy recycled linerboard mill in Los Angeles, Calif., and International Paper Co. possibly reactivating a 130,000-tpy mill in Riegelsville, Pa.

Additional capacity could come from incremental expansion projects involving installation of new high-loading presses. Packaging Corp. of America is believed to be studying such a project, which would involve the addition of 100,000 tpy of incremental capacity. Some tonnage could also come from the shifting of kraft paper machines to linerboard production. All of these factors should keep containerboard operating rates relatively high—but prevent any real shortage of supply.

BOXBOARD

Holding its own into '85

Boxboard mills will experience relatively high operating rates through 1985 due to only slight capacity additions and continued good demand throughout the year, market observers indicate. Pricing should improve throughout the year, with transaction levels reaching—and possibly exceeding—1981 posted levels, which the industry has tried to reestablish for the past three years.

Late in 1984, most 20-pt clay-coated boxboard in rolls was being sold at about $400/short ton, although some was as high as $445. Chipboard prices improved somewhat, reaching about $300/ton early in the year in many areas and as much as $360 in the West. Those levels were maintained well into the fourth quarter despite a drop-off in orders due to a decline in construction activity. Much of the strength in chipboard markets was attributed to substantial demand for gypsum linerboard.

The recycled board market was firmest on the West Coast, with chipboard in that region stronger than clay-coated in backlogs as well as pricing. Recycled board price increases posted in the West in March/April were generally accepted.

Solid bleached sulfate (SBS) prices improved somewhat during the year. One marketing executive estimated they rose 10% from the previous year, while another said the hike was as much as 13%. SBS 15 pt in rolls was being sold for about $600/ton to most customers, while others were paying as much as $665. Price increases posted throughout the year were partially implemented, succeeding mostly in reducing discounts rather than raising actual transaction levels.

Converted carton prices remained depressed on large orders and national accounts mainly due to too much converting capacity and the ability of midwestern converters to buy, convert, and ship cartons to the West Coast at lower prices, said one marketing executive.

PRICE HIKE EFFORTS. Despite lackluster markets, producers continued to attempt to raise prices late in the year (a normally slow season for containerboard) in an attempt to meet rising costs, especially for secondary fiber. Wastepaper prices shot up, more than doubling in some cases, during the first half of the year. They declined gradually in the last six months, providing some relief for recycled board producers.

With only one new 175,000-short-tpy bleached board machine coming onstream in 1985, SBS operating rates

should reach the high 90% range in 1985, some observers estimate. Clay-coated recycled board running times will remain in the low 90s, though, because of existing overcapacity. Uncoated recycled markets could be the firmest of all because capacity in this sector has actually declined in recent years.

Paper industry analyst Thomas Clephane of Morgan Stanley & Co. expects bleached board mills will run at 98.91% of capacity in 1985, while recycled board mills will operate at 92.09%. These compare with a projected overall industry operating rate of 96.37% in 1985.

Industry backlogs were dropping and customers' inventories were high late in 1984, but many industry observers were optimistic that business would pick up again in 1985. Some observers attributed the decline to an adjustment in the market caused by too much optimism earlier in the year, which caused inventory buildup. One marketing executive felt the market's balance would be restored by the end of the first quarter of 1985.

Many observers feel clay-coated board will continue to take a bigger share of the folding carton market from SBS in 1985, though at a slower rate than in recent years. The biggest concern, however, is competition from solid unbleached sulfate paperboard (SUS).

As SUS markets have declined in recent years—particularly in the beverage carrier business—SUS demand has risen in the folding carton sector. Observers feel this trend will continue in 1985, particularly in such end uses as detergent boxes and other products where wet strength is a bigger factor than appearance.

WASTEPAPER

Downturn to level out

Paper stock performance over the next 12 months will lack much excitement, according to many market observers. The deterioration in prices fueled by rising inventories, and a drop in orders through the second half of 1984 will continue during the early part of 1985. No later than the start of the second quarter, the market should level off, reaching a new balance, they believe.

U.S. wastepaper exports are expected to play a key role in the market's performance in 1985, even exceeding 1984's projected record rate of over 3 million tons. The previous high was set in 1980, when 2.66 million tons were shipped, according to the Dept. of Commerce.

Interest rates and the strength of the U.S. dollar will also be important elements in determining how the market will operate in 1985, observers say. One northeastern broker said the strong dollar contributed heavily to the surge in exported wastepaper by lowering the price of imported finished goods. Another said it had a depressing effect, keeping U.S. wastepaper prices high compared with rates in other parts of the world.

Freight charges were also influenced by an inflated dollar, causing shippers to reduce rates on freighters returning from the U.S. to busy exporting countries such as Taiwan, South Korea, and Japan. This not only brought U.S. wastepaper costs more into line with those in such areas as Europe, but also created competition within the U.S., with some freight rates to the Far East from the East Coast close to West Coast charges.

OVERSEAS INFLUENCE. During the summer, as the domestic market weakened, the two coasts competed for overseas business. Foreign buyers, aware that the market was deteriorating, took advantage by undercutting prices. Domestic price competition followed.

By year-end, prices were being slashed heavily for some grades. Hardest hit were the high grades because these prices had risen the most earlier in the year when panic buying caused supplies to dip dangerously low and mills to bid against one another for orders.

A two-month lockout in the British Columbia pulp and paper industry in the first quarter, combined with strengthening business activity during the first half of 1984 in such key areas as autos and construction, fueled the scramble for orders that lent a false buoyancy to the market, some market observers said. This began to taper off in the second half as higher grades stabilized, while oversupplies in some lower grades began to surface.

Pulp price deterioration later in the year had a severe impact on pulp substitutes and high-grade deinking prices during the fourth quarter. Prices in the lower grades had begun to deteriorate in the third quarter in an effort to slow down the supply stream. Collection of such grades as old corrugated containers (OCC) and old news had reached saturation due to prices being pumped up earlier in an effort to meet rising demand.

SECOND-HALF PICKUP. During the second half of the year, while the economy was weakening, several strikes in the West accelerated the decline in the secondary fiber market in that region, causing an oversupply in some grades, particularly OCC. This glut is expected to continue through the first quarter of 1985, begin to turn around in the spring, and possibly lead to strong demand—even shortages—in the third and fourth quarters, according to one west coast executive.

The startup of Inland Container's 175,000-tpy Ontario, Calif., recycled linerboard mill in late 1985 will absorb 18,000 tons/month from that region's paper stock supplies, he noted. This will lessen overseas influence in that area and possibly cause Far East consumers to shop in other regions, further tightening those markets.

In addition to a relatively flat market forecast for the wastepaper sector in 1985, fewer structural changes should be experienced than in 1984. The year was marked by many mills changing hands, going bankrupt, or integrating with converting operations.

In its most recent capacity survey released in November 1984, the American Paper Institute projected wastepaper demand as a percentage of total fiber furnish will increase to 24.2% in 1987 from 23.2% in 1984.

The changes in 1984 have led many market observers to expect wastepaper demand to rise in the next few years, with the role of the independent dealer and small mill operator being diminished further by corporate integration into the market. ■

CANADIAN INDUSTRY

MORE SILVER LININGS THAN CLOUDS AHEAD FOR CANADA'S TROUBLED MILLS

■ Canada's pulp and paper industry seems to be approaching peak operating conditions in every respect except pricing, and even there most observers expect some improvement in 1985. Operating rates will average between the mid-90s and 100%. Prices should generally rise somewhat faster than North American inflation rates.

Canadian mills won't get much of a boost from the performance of their own economy, and not much more from the U.S. economy. A survey of economic forecasters performed by the Conference Board of Canada in late 1984 calls for a 2.6% rise in Canada's gross national expenditure (GNE) in 1985, down from 4.2% last year. The Conference Board itself is even more bearish, calling for GNE growth to fall from 4.1% in 1984 to 0.6% in 1985, with nearly flat performance rates expected in some provinces.

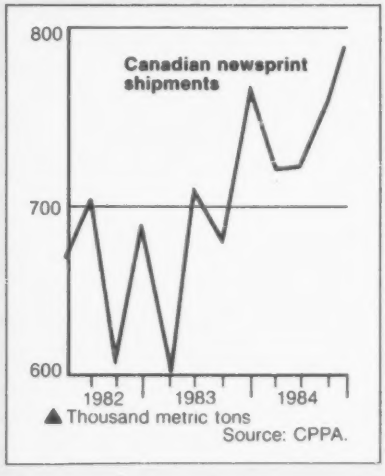
Disagreement is more widespread on the inflation front, with some economists expecting modest rises in prices. The Bank of Montreal forecasts a consumer price index (CPI) increase of 3.1% this year, after a 4.4% estimate for 1984. Others are much more bearish. The high-side estimate comes from McLeod Young Weir Ltd., which believes the CPI will rise 6.5% this year after going up 4.5% in 1984. The consensus estimates are for increases of 4.5% in 1984 and 4.8% in 1985.

While economic activity is moderating and inflation is heating up slightly, maturation of the recovery will bring average pretax corporate profits back to a more sustainable 10.5%, according to the consensus, after 1984's increase of 24.5%. At the same time, Canadian industries will be investing more in plants and equipment. Growth in that area will go from 1.9% in real terms in 1984 to 4.4% in 1985. Financing will be more expensive, however, with the finance companies' 90-day rate going from 11.65% in 1984 to 12.21% in 1985.

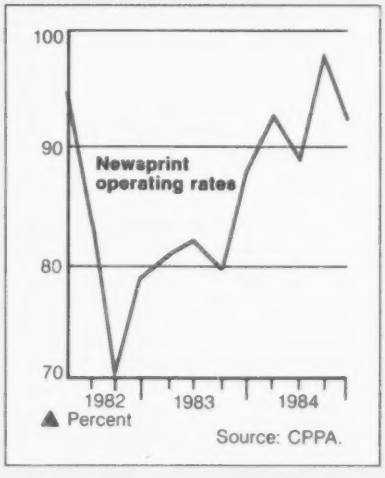
In the consumer sector of the economy, Canadian housing starts should total 148,000 in 1985, according to the consensus, compared with 141,000 last year. Personal consumption will rise by 2.5%, after last year's 3.6% increase. Consumption will benefit marginally from a very slight drop in unemployment from 11.2% to 11.0% in 1984, according to the consensus. The Conference Board itself actually expects to see unemployment rise to 11.5%, while Richardson Greenshields feels it will moderate to just 10.1%.

One of the most important indicators of the health of the Canadian pulp and paper industry is the level of the Canadian dollar since the Canadian profit picture has a discounted dollar built into it. The consensus calls for a Canadian dollar averaging US$0.7693, virtually unchanged from 1984. Each economist places a different value on the 1984 dollar, but none sees more than a three-cent change in 1985. McLeod Young Weir believes

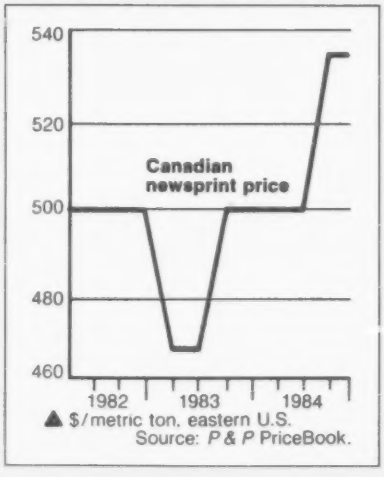
CANADIAN NEWSPRINT SHIPMENTS ROSE . . .



. . . AND OPERATING RATES CLIMBED FROM DEPTHS . . .



. . . WHILE PRICES STRUGGLED TO REBOUND



(Outlook continues on page 71.)

the Canadian dollar will rise from US$0.75 to US$0.78 (both are year-end figures rather than the annual averages in McLeod's case).

Economic performance will vary widely by province. The Conference Board believes real gross domestic product will be up 0.8% this year after a 3.9% rise in 1984, with Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Prince Edward Island, and Saskatchewan performing above par and Newfoundland, Ontario, and Quebec showing little economic improvement. Only Saskatchewan will show even slightly robust growth, with a 3.8% rise forecast. Unemployment will range from the 8.0% of Saskatchewan to the 21.1% of Newfoundland.

With that kind of unimpressive domestic performance, Canada's pulp and paper mills will have to rely on the U.S. economy for any kick it's going to get. The Conference Board's consensus calls for the U.S. economy to grow at a 3% rate in 1985, down from 7% in 1984. But fortunately for Canadian industry, most mills were enjoying healthy operating rates at the start of 1985 and should be able to maintain or even improve them throughout the year—even with slow economic growth.

Newsprint mills should run at 93% this year, with eastern mills operating two or three points higher than that. British Columbia producers are running 10% or more behind. Uncoated groundwood mills will operate virtually full-out—95% or better, in all likelihood. Canadian chemical paper-grade market pulp mills, however, may not run much better than their 88% to 89% average rate for 1984 (which included the nine-week British Columbia strike).

Price improvement will be the rule, with healthy increases likely in some uncoated groundwood grades and a gradual improvement in newsprint. Yet newsprint will still fall short of long-term historical trend-line levels. Pulp prices will probably show further weakness in the first half of this year before firming.

NEWSPRINT

Recovering from weak markets

In any other year than 1984, newsprint producers would have been ecstatic at the way their business grew. U.S. consumption rose by about 7%, growing at a nearly double-digit pace well into the second half. And both U.S. and Canadian industries improved their operating rate performances dramatically from 1983's recession-depressed levels: the U.S. industry ran at a 3% higher operating rate than in 1983, and Canada operated more than 5% better than the previous year.

Unfortunately, continued world oversupply in newsprint and a recession hangover of price discounting made 1984 a year of clouds and silver linings. And 1985 won't start out much better.

Through the first half of 1985, discounts will continue to be common. The industry in the East will struggle to push through an Apr. 1 price increase, and opinion is divided on how long it will take before the hike sticks. The industry in the West may try for a second-half hike, but observers say there are still too many questions to make any prediction of 1985 price behavior look like a safe bet.

It seems clear that demand won't grow as fast this year as it did in 1984. The consensus has U.S. consumption growing from 11.3 to 11.4 million metric tons in 1984 to about 11.5 to 11.7 million metric tons this year. *Pulp & Paper* is forecasting a 3% growth in consumption in 1985, identical to what is seen by Bell Gouinlock Ltd. security analyst, Brian Topp, of Toronto, Ont. But a marketing executive with one major producer sees growth of just 2%, and analyst Jaak Puusepp of Pemberton, Houston, Willoughby, of Vancouver, B.C., calls for growth of just 0.5%.

Tim McManus, a senior vice president with Central National-Gottesman Inc., wrote in 1984's fourth quarter edition of his company's "Central National-Gottesman Report" that his forecast of a consumption rise of 2.5% to 3% this year is "inline with the majority of the estimates for growth in GNP."

Indeed, the health of the U.S. economy is the key to the performance of the newsprint industry this year since the industry will not be aided by most of the factors that helped it in 1984: inventory accumulation, a U.S. national election, the Olympics, and the normal buoyancy of an economic recovery period.

But 1984 created a strong base for future growth. What that means for the North American industry this year is a very good year in terms of operating rates, probably leading to an even better 1986. This will be a year of firming in prices, perhaps setting the stage for big increases in the next two years.

Producers will continue to complain through 1985 that their profits are a long way from where they should be on a historical trend-line basis. And publishers will continue to be effective at using imports and small North American producers to partially frustrate the pricing intentions of the old "club" of major North American manufacturers.

U.S. VS CANADIAN MILLS. In the last few years, large producers have often found themselves taking lower operating rates than the industry average in order to support industry pricing. Since U.S. capacity is more in the hands of small producers than is Canadian capacity—and since U.S. publishers would often rather buy domestic paper than import from Canada—the U.S. industry tends to run slightly better than its northern counterpart. The comparative operating rates for 1984 were about 93% for the U.S. and 91% for Canada. In 1985, those rates should rise to 96% and 93%.

Some North American producers in late 1984 were beginning to plan downtime in the coming months, reflecting or anticipating weak order books. Publishers were thought likely to reduce inventories around the end of 1984 or the start of 1985. But with a price hike looming in the East in April, it is possible stocks will be rebuilt in February and March, giving mills a temporary boost. Then, as the year progresses, normal economic

growth—barring a recession—should soak up much of the excess capacity in North America.

But North Americans realize more and more that there is no such thing as a continental newsprint market: markets for commodities like newsprint are global. And the world oversupply situation—in which more than two-thirds of the estimated 3 million short tpy of overcapacity is located outside North America—is likely to continue undermining U.S. pricing in the form of low-priced imports for as long as the U.S. dollar remains overvalued.

NORTH AMERICAN EXPORTS. Concurrently, North American exports should begin to make something of a comeback in 1985, even in the face of a strong dollar. Economies in Europe, Asia, and to some extent Latin America are following the U.S. economy into a recovery. The consensus of observers is that this will provide modest relief for North American exporters. Puusepp projects a 6.2% increase in Canada's shipments offshore, while Bell Gouinlock's Topp actually sees those shipments rising by 10%.

On another optimistic note, Puusepp thinks that the European Economic Community's import quota for duty-free newsprint from outside Europe will be raised this year from 635,000 tons to 750,000 tons. This will help Canada to supply growing European needs if it can compete with Scandinavian suppliers on price.

Whether offshore shipments from Canada will return to 1983 levels or not remains to be seen. Offshore shipments in 1984 dipped by about 8% from the previous year, with major growth in shipments to Asia being more than offset by sharp drops in Europe and Latin America. Overcapacity in Europe, combined with the strong dollar and the ability of Scandinavian mills to continually underprice Canadian paper, is likely to continue hurting Canada through much of the year. In the October 1984 issue of *PaperTree Letter*, publisher Ross Hay-Roe noted that 900,000 metric tons of capacity is starting up in western Europe alone in 1984-85.

Unfortunately for North American mills, that means the oversupply situation on this continent will still take some time to disappear, as Canadian tonnage displaced from overseas markets is forced back into North America. The overcapacity situation is worse in the West than in the East due to overbuilding of capacity in the early 1980s. Pemberton's Puusepp thinks Canadian operating rates will average 92.3% in 1985, with mills in the East leading the pace at 94.6% while British Columbia producers lag far behind at 81.1%. At the same time, U.S. mills will run at 96.4% this year in Puusepp's scenario.

NORTH AMERICAN NEWSPRINT SUPPLY/DEMAND BALANCE (000 metric tons).

	1984e	1985e
U.S. consumption	11,330	11,670
Net inventory change	+232	−100
U.S. demand	11,562	11,570
Sources of U.S. supply		
U.S.	4,748	4,718
Canada	6,609	6,677
Europe	205	175
Canadian shipments		
To U.S.	6,609	6,677
To Canada	1,038	1,069
Overseas	1,292	1,421
Operating rate (%)		
U.S.	95	96
Canada	90	92

Source: Brian Topp, Bell Gouinlock Ltd. e = Estimate.

FLOOD OF IMPORTS. While the West continues to be flooded with excess domestic supply, most observers point to imports as a contributory factor. Puusepp feels total offshore imports to the entire U.S. will run at about 200,000 tpy for the next two years, compared with 1984's 220,000 tons. One major North American producer actually thinks imports will rise by more than 10%.

On the other hand, Crown Forest Industries' vice president of newsprint and pulp sales, Brian Cooper, told *Pulp & Paper International*'s recent Second International Publication Papers Conference in London that the western region of the U.S. has exceptional economic prospects, which should help western mills to survive the current troubles. "With California's high-tech industries and diversified economy, its total employment and income are both forecast to outperform the national averages over the next three years," Cooper noted.

Cooper also remarked that British Columbia is in an ideal position to exploit growth potential in Far Eastern markets. Quoting Stanford Research Institute, Cooper noted that "for the period to 1995, North American newsprint exporters need to look to Asia for trade expansion. Asian imports will grow by 4.5% annually."

But in the meantime, British Columbia mills—like their competitors in the East—will spend 1985 recovering from one of the biggest capacity expansion hangovers in paper industry history.

Little new capacity expansion is planned for North America in the next few years. Only one new mill is planned at this time: Great Lakes Forest Products Ltd.'s 154,000-metric-tpy Washington State project, with start-up set for early 1987.

In fact, no other projects are in the works that represent a significant net addition to capacity. In 1985, U.S. capacity is expected to drop by 1.5% from 1984, and Canadian capacity will drop by about 1%. This trend of flat or declining capacity is expected to continue through 1986.

DISCOUNTING WIDESPREAD. While capacity trends bode well for producers in the long run, they don't appear to be happening fast enough to help in the first half of 1985. In late 1984, publishers reported they were getting frequent phone calls from mills they normally do not do business with offering spot orders at substantial discounts.

One buying cooperative negotiated a five-year contract with Rothesay Newsprint, giving the co-op's members a reduction of 7% from Rothesay's list price over the life of the contract if they take approximately the

NORTH AMERICAN NEWSPRINT OPERATING RATES (%).

	1984	1985	1986
United States	96.0	96.4	96.4
Canada	92.4	92.3	97.0
Eastern Canada	96.0	94.6	98.9
Western Canada	75.1	81.1	87.3

Source: Jaak Puusepp, Pemberton, Houston, Willoughby Ltd.

contracted 1,000 tons a month. Larger discounts than that were given to several major publishers on many spot orders.

But the industry was expected to support the April price increase, at least to the extent of discounting from the new, $570/metric-ton level rather than from the present $535 level. Indeed, Topp thinks Abitibi-Price—which he believes is trying to become a price leader again—will try to raise prices again, to $600, in the fourth quarter of 1985. He is optimistic that Scandinavian shipments to the U.S. will drop slightly in 1985, helping to buoy U.S. prices.

Ross Hay-Roe wrote in October that a price increase is likely in the West as well as in the East this spring. Puusepp expects western prices to go up by $35 July 1. He also believes that "a healthier pricing environment" will develop in 1986 as operating rates improve to 98.9% in eastern Canada, 87.3% in British Columbia, and 96.4% in the U.S.

One major Canadian producer told customers, in a corporate newsletter, that some tightness could occur in 1986 as demand improves and some machines are upgraded to groundwood specialties. The newsletter also observed that increasingly serious shortages will appear in 1987 and 1988, barring the announcement of significant new capacity soon. Clearly the company feels any capacity expansion would have to be financed by higher prices.

But on the other side of the aisle, Scripps-Howard Supply Co. president, Homer E. Taylor, told *presstime* (the publication of American Newspaper Publishers Assn.) in November that the chances of an April price hike in the East depend on how the market looks early in the year, adding that "right now it appears to be very loose."

Furthermore, newspaper industry analyst John Morton, of Lynch, Jones & Ryan, wrote in a recent issue of his *Newspaper Newsletter* that "even that [April 1] appears optimistic, unless the dollar falls in value and a continuing surge in advertising volume keeps consumption growing at its presently healthy pace (neither case seems likely at the moment). Sooner or later, demand may very well catch up with supply. But until that time, the newsprint business will remain a frustrating one."

Even so, most observers believe the level of frustration in newsprint will be a lot lower in 1985 than it was in the previous two or three years—and the outlook for 1986 could be quite a bit better.

UNCOATED GROUNDWOOD

Making all the paper they can

Most uncoated groundwood paper mills in Canada and the U.S. couldn't have made much more paper in 1984 if their lives depended on it, and 1985 is bound to be a bit better. With the exception of some lingering softness in the low end of the quality spectrum, this sector of the industry is enjoying a papermaker's dream.

Gains were felt first in the top end of the quality and price spectrum, with advertisers and printers forced to accept uncoated paper because of shortages in coated paper supply. That led some magazines and insert and flyer printers to switch to supercalendered uncoated groundwood paper (SC), or even to premium rotonews. The benefits rolled down the scale until even bottom-range offset and rotonews were helped, although far less than their more elegant companions.

DOUBLING OF SC MARKET. SC, in particular, has become a major market in just a few years—more than doubling in size in the U.S. between 1980 and 1984 to today's estimated 865,000 short tpy. The future of the market is very much in flux, with a number of companies rumored to have been looking at getting into the business over the last year—but no actual announcements were made.

European producers who represent about 45% of North American supply—and who are most heavily concentrated in the premium area of the market represented by fully clay-filled sheets—are said to be telling customers they may not be able to keep up present levels of shipments through 1985 due to demands from home-market consumers.

Most observers expect two or three major expansions to take place within the next two to three years. Bell Gouinlock Ltd. analyst, Brian Topp, of Toronto, Ont., believes that likely shutdowns of old groundwood specialties machines will be offset by new SC installations and switches of newsprint machines to various groundwood specialties products.

In the meantime, demand for SC is expected by observers to exceed supply for as long as coated paper remains tight. Demand may get a boost this year from the Sunday supplements, which are expected to take a look at upgraded sheets in order to stem recent advertising lineage losses. (The Sunday magazines may also be getting a boost from a switch on the part of mega-advertiser Procter & Gamble to more use of print media, including Sunday supplements.) The supermarket tabloids may look at similar upgrades in paper quality.

There is some doubt that the Sunday publications and the tabloids will make the expensive jump all the way up to SC, but it is clear nonetheless that SC is becoming established enough to have gained some credibility as an attractive product in its own right, not just a cheap alternative to coated paper.

With mills that can make high-brightness, top-quality paper running virtually sold out through the year, North

American uncoated groundwood mills are expected, on average, to continue operating at 1984's 95% of capacity or better. Indeed, if year-to-year increases in shipments are modest, it will only be because most mills can't get a great deal more production out of existing machines.

Morgan Stanley Inc.'s Thomas Clephane estimates U.S. mills as a whole ran at 99% in 1984 and should average about 101% in 1985. Recovering from the recession of the previous years, mills were able to boost shipments by about 7% in the U.S. Some outstripped that, particularly in shipments to commercial printers, which were up by more than twice the average. Book and magazine publishers increased their purchases of uncoated groundwood by about the industry average or a bit less. Shipments to catalog and directory printers somewhat exceeded that level of increase.

CANADIAN CAPACITY JUMPS. The Canadian mills were running about 20% ahead of the previous year, partly because of the contribution of Abitibi-Price Inc.'s Beaupre, Que., mill, converted from newsprint, along with other miscellaneous upgrades and conversions—and of course the overall improvement in markets.

Canadian Pulp & Paper Assn. figures show a 5% jump in Canadian capacity in 1984 and another 11% increase in 1985. In the same period, U.S. capacity is expected to remain flat. So if either country's uncoated groundwood industry shows any significant year-over-year increase in shipments this year, it will be Canada's. The increase will reflect the industry's greater ability to meet unprecedented levels of demand. Actual consumption overall is expected to only slightly exceed the 3% growth rate foreseen in the U.S. economy.

A drop in imports from Europe is likely to offset any increase in Canadian capacity as overseas mills respond to pressure from their own markets. European producers are also leery of signing long-term contracts in a period when the dollar may have reached its peak.

Mills that are not able to compete in the top end market may find they are at a competitive disadvantage because some customers are losing interest in 60-brightness standard roto or offset sheets. And producers of groundwood forms will find their product under year-long price pressure from heavily discounted free-sheet forms bond. One producer, however, said he doesn't think groundwood mills will actually lose a big chunk of their market share even if pricing is hurt. Indeed, at the end of 1984, forms converters could get 80-brightness forms bond for less than $100/short ton more than 70-brightness groundwood paper.

PRICE INCREASE. In fact, the whole area of groundwood papers represented by the least expensive forms, rotonews, and offset papers could have some trouble winning sizable price increases in 1985. But products at the top end are expected to rise in price faster than the U.S. consumer price index, and in some cases, perhaps much faster.

SC prices were scheduled to go up 6% in January, approximately matching lightweight coated (LWC) price increases. Observers believe the chances for any further rise in SC quotes will depend on whether LWC mills are able to get through a second increase in 1985, and opinion is sharply divided on that question. But whatever happens with SC and LWC will probably help mills in their efforts to get higher prices for premium offset and roto sheets.

One market that is harder to call than the traditional publication papers for business papers is directory paper, where the breakup of American Telephone & Telegraph into "American Regional Bell Operating Companies" (ARBOCs)—each with its own directory operation and its own paper-buying system—has sown nothing but confusion. This change, plus an increase in the number of paper companies competing for phone directory business, has made for a more competitive market.

One factor that may help paper companies is the proliferation of ideas for novel telephone directories, such as those being discussed for specific professions, ethnic or language groups, and other subsets of the general population. Few of these innovative ideas have yet become a reality, one paper company executive noted, but when they do, "it will make things more interesting for us." In the meantime, he expects the directory paper market to grow at about 4% to 5% this year.

Some areas of the groundwood paper business, like inserts and flyers, have been "going like a scalded cat," in the words of one executive. He reflects consensus opinion when he says that even if there is a slowdown in the economy—which he doesn't expect before the second half of 1985 and probably not before the fourth quarter—it will be manifested in groundwood paper by reduced pressure on mills from paper-short customers, but not an actual drop in shipments. And if there is no U.S. economic slowdown, growth will continue all year long.

MARKET PULP

Oversupply causing price drop

The nine-week British Columbia labor dispute helped pulp prices recover dramatically during the first two quarters of 1984. The labor dispute caused an estimated production loss of more than 600,000 tons of chemical paper-grade pulp, resulting in a major shift in the supply and demand balance.

This was reflected in the price of northern bleached softwood kraft (NBSK), which jumped roughly $100/metric ton in two successive moves to $540/metric ton on Apr. 1 in both northern Europe and North America. But only a few months after the resumption of pulp shipments from the British Columbia mills, the market began to soften.

North American-Scandinavian producer inventories, which had reached a low of 907,000 metric tons during the strike in March, began to climb. By the end of October inventories stood at 1.49 million metric tons. Pulp consumers, which had built up large inventories during the strike, held off on purchases.

PRICES WEAKEN. Pulp prices began to weaken, and by November the price of NBSK had tumbled to about $480 to $490/metric ton in northern Europe. The strong dollar contributed to the drop earlier in the fall by improving the competitive position of Scandinavian and nontraditional pulp producers and increasing the price of pulp in European currencies.

High production levels at existing mills and the start up of new capacity in the second half of 1984 contributed to market weakness. Average Norscan market pulp operating rates in the summer and fall were in the 97% to 98% range. In the U.S., Leaf River Forest Products brought on its new 335,000-tpy bleached kraft mill, and International Paper Co. started up the 320,000-tpy pulp line at its Georgetown, S.C., mill. Several new mills began production in Europe in 1984 (in Portugal, Austria, and Czechoslovakia). Two major projects in South Africa were scheduled to begin production by year-end.

DOWNTIME NECESSARY. "Whether 1985 will be bad or dreadful for North American mills will depend on how much downtime mills are prepared to take," according to Ross Hay-Roe, publisher of the *PaperTree Letter*. "North American mills are now the world's high-cost producers and will inevitably take the bulk of the downtime in an oversupplied market."

But Canadian and U.S. mills in early December appeared unlikely to take the sort of extensive and widespread downtime necessary to bring the market into better balance. "It appears like the same old story will be repeated where mills overproduce, inventories rise, and prices eventually are driven down to the point where it becomes cheaper for high-cost mills to shut down rather than continue to operate because they will lose less money."

That scenario would suggest that market pulp prices have another $50/ton to decline, with prices possibly bottoming out at around $420 to $440—not much better than their level two years ago, according to Hay-Roe. Prices could then begin to firm later in 1985, but from much lower levels.

BEYOND THE BULGE. Beyond the current bulge, no significant market pulp capacity is planned. A new kraft mill in Finland is scheduled for completion in mid-1985, but it will mainly replace exiting sulfite pulp capacity. Champion International Corp. is scheduled to bring on its 235,000-tpy bleached kraft hardwood pulp mill in Quinnesec, Mich., in early 1986. In the following year, Champion will install a new 195,000-tpy uncoated freesheet machine there.

Georgia-Pacific Corp. and Hammermill Paper Co. are also planning to install new white paper machines at their Port Hudson, La., and Selma, Ala., market pulp mills over the 1986-87 period. Together, these three machines will absorb more than 600,000 tpy of available market pulp. Similar forward-integration projects underway in Scandinavia and Portugal will further reduce market pulp supply, pointing to better balanced markets later this decade. ■

LABOR

MODERATION IN DEMANDS

■ Pulp and paper industry contracts negotiated in 1985 in Canada and the U.S. will reflect trends begun during the economic recession of 1982-83. Still seeking to reduce costs while maximizing efficiency, the paper industry is expected to continue to work for modest labor settlements.

In addition to modified contract terms, negotiations in 1985 will be quieter than in previous years due to the fact that bargaining cycles in both the U.S. and Canada are at their low ebbs.

The American Paper Institute estimates approximately 103 mills in the U.S. will have contracts expiring in 1985 compared with 130 in 1984, and 153 in 1983. The previous lull occurred in 1982 when just 109 contracts came up for renewal.

In Canada, the inception of three-year bargaining cycles was implemented within the past two years. These cycles replace two-year terms that had been in existence since 1978 with contracts in the eastern and western regions of Canada expiring in alternate years. The new cycles will result in 1985 being an off-year during which only spot negotiations will occur at those Canadian mills which have contracts expiring in years different from the regional negotiations.

This will allow Canadian mills to "regroup" on both the employee and employer levels, said a Canadian labor spokesman. "Industrial peace is a period to make improvements in labor relations," he noted.

GROUP TALKS STUDIED. Already in 1984, employers in British Columbia had begun reviewing their labor relations policies, considering changes in their bargaining pattern. A total of 14 pulp and paper companies in the province have for the past three decades bargained jointly through a trade association called the Pulp & Paper Industrial Relations Bureau (PPIRB). That could change, though, by the time the current three-year contract expires in June 1986.

In November 1984, members of the PPIRB applied to have the association deaccredited to allow them the option of withdrawing from group negotiations prior to the start of the next bargaining round. The association is ex-

pected to continue to study alternate bargaining procedures through 1985.

In eastern Canada, the unions are expected this year to review ways they might reinforce their positions in contract talks. In recent years, their membership rolls have been somewhat depleted by productivity improvements and loss of members.

The Canadian Paperworkers Union (CPU), the largest Canadian union, indicated late in 1984 that it would consider a merger with another union. Two years earlier its membership had voted down by a narrow margin a proposal to combine with another union.

A merger vote stands a much better chance of passage in 1985, however, because CPU delegates voted at the union's biennial convention in 1984 to allow a motion to pass if over 50% of the membership is in favor, compared with the larger majority required previously.

UNION GOALS CHANGED. Unions will also likely be planning for the resumption of bargaining in 1986 in

MAJOR CONTRACTS BY REGION ON 1985 U.S. PAPER INDUSTRY BARGAINING CALENDAR.

Company	Mill location	Union	No. of employees	Contract expires
New England region				
S.D. Warren (div. Scott Paper)	Westbrook, Maine	A,B,O	346	4/1
Madison Paper	Madison, Maine	U	936	6/1
		U	184	4/30
Pejepscot Paper (Hearst)	Pejepscot, Maine	U,A,O	196	6/15
James River	Berlin, N.H.	U	1,227	6/24
Scott Paper	Winslow, Maine	U,A,O,B	700	6/30
Erving Paper	Erving, Mass. Brattleboro, Vt.	U	489	8/1
Fitchburg Paper (div. Technographics)	Fitchburg, Mass.	O	179	8/15
James River	Groveton, N.H.	U	450	9/1
S.D. Warren (div. Scott Paper)	Skowhegan, Maine	U,B,A	429	9/30
Eastern region				
Westvaco	Tyrone, Pa.	U,B	227	2/17
Scott Paper	Fort Edward, N.Y.	U,B,O	425	3/31
Manning Paper	Troy, N.Y.	U,B,A,O	179	4/1
International Paper	Ticonderoga, N.Y.	U	700	6/1
Riegel Products (div. James River)	Hughesville, N.J.	U,B	53	6/1
	Milford, N.J.	U,B	405	6/1
	Warren Glen, N.J.	U,B	164	6/1
Finch, Pruyn & Co.	Glens Falls, N.Y.	U,A,B,O	587	6/15
Hammermill	Castanea, Pa.	U	108	6/20
	Lock Haven, Pa.	U	563	6/20
Tagsons Papers	Menands, N.Y. Mechanicville, N.Y.	U	226	7/1
Newton Falls	Newton Falls, N.Y.	U	447	8/15
Marcal Paper	Elmwood Park, N.J.	U	732	9/15
Potlatch	Ransom, Pa.	U	360	9/17
Crown Z	S. Glens Falls, N.Y.	U	285	10/1
Appleton Papers	Roaring Springs, Pa.	U	388	11/17
Midwest region				
Simpson Paper	Vicksburg, Mich.	O	240	1/26
Niagara of Wisconsin	Niagara, Wis.	U,O	516	1/31
Miami Paper (div. Pentair)	W. Carrollton, Ohio	U	278	4/5
Boise Cascade	International Falls, Minn.	U,B,A,O	1,250	4/30
Champion	St. Paul, Minn.	U	814	5/1
Scott Paper	Marinette, Wis.	U	563	5/14
	Oconto Falls, Wis.	U	183	5/30
Nekoosa Papers	Nekoosa, Wis.	A,O,U,P	757	5/31
	Port Edwards, Wis.	A,O,U	904	5/31
Owens-Illinois	Tomahawk, Wis.	U,A	354	6/15
St. Regis	Battle Creek, Mich.	B,O	138	6/30
Flambeau Paper (div. Pentair)	Park Falls, Wis.	U	507	7/31
Mead	Chillicothe, Ohio (Chilpaco)	U	729	8/1
	Cincinnati, Ohio	U	145	8/1
	Chillicothe, Ohio (Forms div.)	U	1,342	8/2
Southern region				
Mead	Kingsport, Tenn.	O	816	1/24
Southwest Forest	Panama City, Fla.	U,B,A	660	3/1
Buckeye Cellulose	Memphis, Tenn.	R,O	255	3/7
Jacksonville Paper	Jacksonville, Fla.	U,B	509	6/8
Chesapeake	West Point, Va.	U	559	6/16
Georgia-Pacific	Crossett, Ark.	U,A	1,144	6/30
St. Regis	Pensacola, Fla.	U,B	709	6/30
Union Camp	Franklin, Va.	U,O	1,203	6/30
Westvaco	N. Charleston, S.C.	U,B,A	951	6/30
Owens-Illinois	Orange, Texas	U	357	7/31
St. Joe Paper	Port St. Joe, Fla.	U,B,A	612	7/31
Stone Container	Hopewell, Va.	U	364	7/31
Mead	Lynchburg, Va.	U	401	9/16
International Paper	Vicksburg, Miss.	U,B,O	262	9/26
MacMillan Bloedel	Pine Hill, Ala.	U	397	10/4
International Paper	Pineville, La.	U	227	10/10
Arkansas Kraft	Morrilton, Ark.	U	303	10/14
Container Corp. of America	Brewton, Ala.	U,B,A,O	488	10/15
Tennessee River Pulp & Paper	Counce, Tenn.	U,B	359	10/27
Owens-Illinois	Big Island, Va.	U	253	10/31
Harriman Paperboard	Harriman, Tenn.	A	125	11/14
International Paper	Texarkana, Texas	U,B	638	11/30
Pacific Coast region				
James River	Halsey, Ore.	U,B	492	2/1
Crown Z	Clatskanie, Ore.	U	697	3/31
Garden State Paper	Pomona, Calif.	U	108	4/30
Keyes Fibre	Sacramento, Calif.	U	225	5/1
Simpson Paper	Pomona, Calif.	W	397	6/1
Willamette	Albany, Ore.	W	309	6/1
Simpson Paper	Anderson, Calif.	U	461	6/14
Inland Container	Newark, Calif.	U	43	6/30
Federal Paper Board	Los Angeles, Calif.	U	87	7/31

U=United Paperworkers International Union; W=Association of Western Pulp & Paper Workers; A=International Association of Machinists & Aerospace Workers; B=International Brotherhood of Electrical Workers; O=Others.
Source: American Paper Institute Employee Relations Dept.

British Columbia, determining what their goals will be. They are expected to remain less militant in their approach to negotiations and more modest in their demands than in years prior to the downturn in the industry, observers say.

Since 1981, there have been fewer strikes, and wage demands have been significantly lower than previously. This is expected to continue through 1985 and possibly beyond, depending on market conditions.

Unions in Canada have tended to be more concerned with job security and other monetary issues in recent years—further evidence of an increasing concern over declining membership due to market conditions and industry modernization.

Likewise, unions in British Columbia are likely to resist a move to change the bargaining structure by splitting up the companies that have bargained jointly in the past. This would considerably reduce the unions' collective power by scattering talks throughout the province.

Labor's demands are expected to be more moderate in 1985.

Companies, on the other hand, question the advantage of continuing to bargain together. The last round of joint talks in British Columbia dragged on for more than 14 months, during which the unions were locked out for two months, causing considerable loss in production and customer confidence.

COST CUTTING A PRIORITY. In the U.S., unions have problems similar to those of their counterparts in Canada: dwindling membership, less clout at the bargaining table, and loss of jobs to technology, among other things. In the past three years, U.S. unions have given way in an increasing number of cases to cost-cutting measures sought by employers in an effort to remain competitive.

With the economy expected to be relatively flat, the dollar relatively strong, and inflation modest in 1985, companies are expected to maintain a belt-tightening stance in contract talks. In addition, unemployment is expected to remain relatively high, causing unions to remain more amenable to modest contract settlements.

The Conference Board expects unemployment will be flat in 1985, staying at about 7.2%, with some sectors continuing to trim their staffs. "Most of the heavy manufacturing companies still have too many people who are underutilized," the board noted.

Wage increases will also remain modest in 1985, the Conference Board indicated. Average hourly earnings in the private sector are expected to advance by 3.5%, while unit manufacturing costs will rise by 2.5%. In the unionized sector, first-year benefits and wages are likely to go up 4%.

According to American Paper Institute employee relations vice president, Richard Klinzing, health care cost containment will be one of the major issues in 1985. "The containment of rising health care costs requires continued efforts; it's not something that can be effectively dealt with in a short period of time," he said.

Companies are also likely to continue to seek greater flexibility in assigning jobs and scheduling output. Production restrictions on holidays will continue to be one of their targets. Greater freedom in assigning jobs using such procedures as the team concept will also be sought in an effort to improve the companies' competitive positions.

WESTERN HEADWAY. Considerable progress was made in 1984 in giving employers more say in the use of their work force. Probably the most significant steps were made on the West Coast where companies resisted union efforts to fight implementation of flexible work assignment programs. Long strikes became rampant, but mills were run with salaried staff.

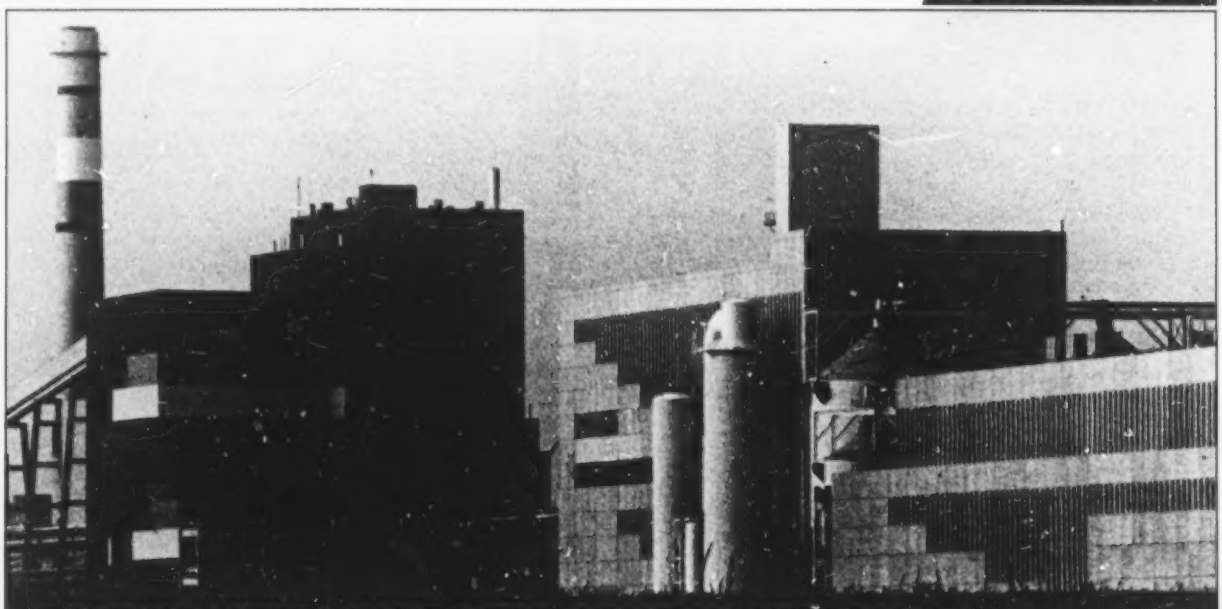
Crown Zellerbach Corp. took one of the stronger stands, permanently closing its Los Angeles, Calif., mill. Shortly afterward, workers approved the company's offers at some of its other mills. In addition, many West Coast mills negotiated contracts initiating employee contributions to health care plans.

West Coast labor settlements were a lot lower than in other parts of the country in 1984, resulting in base wage rates more in line with the rest of the country. Likewise, more modest increases in Canada will result in eastern Canadian rates being close to British Columbia wages by 1986—the first time the regions have attained parity.

Canadian pay in U.S. dollars was higher than U.S. wages during 1975-77, about the same as the U.S. in 1978-83, but dropped sharply in 1984, according to the publication *Canadian Paper Analyst*. This reflected not only a lower rate of pay increases negotiated, but also a significant decline in the value of the Canadian dollar against its U.S. equivalent.

With relatively little bargaining anticipated in the Canadian industry, and fewer contracts expiring in the U.S. than in the past two years, plus a flat economic picture for 1985, the year should be calm.

1985 could mark a major turning point for many companies, though. Studies that are to be conducted this year could change the way some companies bargain in years to come. The bargaining procedure for the entire British Columbia pulp and paper industry could be overhauled and the CPU's membership structure could be changed drastically.



Union Camp Corp.'s Eastover, S.C., 215,000-tpy, integrated uncoated free-sheet mill started up in fall 1984.

CAPITAL SPENDING

The latest round of capacity additions lifts industry's North American capital spending plans to new highs

By CARL ESPE, News Editor and STEPHANIE POLLITZER, Consulting Editor

■ Encouraged by strong demand, high operating rates, and greatly improved earnings, papermakers in the U.S. stepped up their capital spending plans to new highs in 1984, while Canadian producers raised their sights substantially from the depressed spending levels of the past several years. *Pulp & Paper Project Report*'s annual survey of spending plans at North American pulp and paper mills shows planned expenditures up 27% compared with the previous year's survey. U.S. papermakers plan to spend $8.2 billion for the 1984-86 survey period, up from $6.5 billion in the previous year, while Canadian spending totals C$4.6 billion, up from $3.6 billion.

Responding to tight markets, a number of companies announced plans in 1984 for new paper machines as well as several greenfield mills, which has boosted spending totals in both the U.S. and Canada. The lower inflation rate and attractive financial incentives, such as the 1981 depreciation allowance in the U.S., have also encouraged higher spending, according to analysts. Another factor is the strong dollar, which has made overseas competition tougher for U.S. producers, underscoring the need for modern, efficient operations.

Commerce expects record. Paper companies planned to spend a record $7.13 billion in 1984 on new plant and equipment, up 15.4% from 1983 spending of $6.18 billion, according to a Commerce Dept. survey conducted in July and August 1984. Spending for new plant and equipment at U.S. paper mills reached a seasonally adjusted annual rate of $6.93 billion in the first quarter and $7.05 billion in the second quarter. Spending was expected to increase to an annual rate of $7.25 billion in the third quarter and $7.28 billion in the fourth quarter, easily surpassing the old mark. Industry expenditures peaked in 1980 at $6.80 billion before dropping during the recession to a low of $5.97 billion in 1982.

In its annual fall survey of U.S. business's capital spending plans, McGraw-Hill Economics forecast U.S. paper industry outlays of $6.83 billion in 1984, up 10.5% from 1983. According to the survey, paper industry capital outlays will reach record highs in 1985 and 1986: $7.51 billion this year, up 9.9% compared with 1984 and $8.07 billion in 1986—an additional 7.5% rise.

Canadians back on track. Although they have a long way to go before matching prerecession spending levels, Canadian producers now seem to be heading in the right direction. Canadian producers planned capital expenditures of C$1.27 billion in 1984, up 19.8% from $1.06 billion in 1983, according to Statistics Canada's mid-1984 review. Spending for new machinery and equipment was expected to rise 20.4% over 1983, to $1.12 billion.

ABOUT THE SURVEY DATA. The tables and lists in this report are compiled from *Pulp & Paper Project Report*'s annual survey of expansion/modernization programs at U.S. and Canadian mills. The dollar figures represent the total cost of reported projects and sometimes may include supporting equipment. The total cost of multiyear projects is assigned to the startup year and is not divided among the years of expenditure.

Assignment of cost data to various categories—pulping, for example—is based on data from reporting companies whenever available. When such cost breakdowns are not provided, the figures reflect an estimate by *P&P* staff. Guidelines in assigning cost data to categories include the following: recovery boiler projects are listed under "pulping" unless identified as environmental; expenditures for large new machine installations or greenfield mills are divided among the categories, presuming a reasonable assumption of proportionate costs; the "miscellaneous/plant" category includes coating and finishing operations, as well as plant and building structures and projects reported as miscellaneous.

P&P's exclusive survey of capital spending programs for 1984-86 by companies lists programs for new mills and machines, rebuilds and modernizations, plant improvements, with specifics of equipment ordered, suppliers, and price (where reported). Separate listings show projects for environmental control. The survey is not published in the magazine but is available as a separate booklet. Price: $85; free to subscribers to* P&P Project Report. *To order: send payment (in US$) to* Pulp & Paper, *Editorial Dept., 500 Howard St., San Francisco, Calif. 94105.

UNITED STATES

Capacity additions boost spending growth; environmental outlays fall

■ U.S. pulp and paper companies plan to spend $7.75 billion for production-related projects in the 1984-86 survey period, up 32.9% from the 1983-85 period. That total includes an estimated $1.02 billion in projects scheduled for completion in 1987 or later. Production-related spending accounts for 94% of total outlays in the current survey, up from 90% last year.

Last year's survey showed an emerging emphasis on incremental production expansion through rebuilds and modification of existing equipment, and this year's results confirm that trend. Outlays for machine modification amount to 13% of overall capital spending in the 1984-86 period, the current survey shows—up from 11% last year and from only 6% the year before.

On the strength of a new round of capacity additions in several grades, outlays for new paper machines showed the largest percentage jump in this year's sur-

SEVEN-YEAR CAPITAL SPENDING TRENDS

UNITED STATES

P&P's reported three-year spending ($ billion)

Year	Period	Production	Environment		Total	Annual capital expenditures[1]
			Water	Air		
1985	1984-86	$6.733[2]	$0.172[2,3]	$0.270[2]	$7.175[2]	$ (7.70)[4]
1984	1983-85	4.857[2]	0.271[2,3]	0.325[2]	5.452[2]	7.13
1983	1982-84	6.095[2]	0.376[2,3]	0.460	6.931[2]	6.19
1982	1981-83	6.216[2]	0.635[3]	0.677	7.528[2]	5.97
1981	1980-82	7.783[2]	0.531	0.568	8.882[2]	6.72
1980	1979-81	8.003[2]	0.515	0.360	8.001[2]	6.80
1979	1978-80	4.911	0.350	0.251	5.759[5]	5.55

1. Based on data from U.S. Commerce Dept.
2. Based on *P & P* survey for 3-year period; not comparable to U.S. Commerce data since *P & P* information can include only dollar amounts that have been released publicly. Please note: 1985 data does not include $1.058 billion for projects to be completed in 1987 or later ($1.021 billion production; $0.037 billion environmental); 1984 data does not include $1.018 billion for projects to be completed in 1986 or later ($0.977 billion production; $0.041 billion environmental); 1983 data does not include $1.292 billion for projects to be completed in 1985 or later; 1982 data does not include $2.8 billion estimated for projects to be completed in 1984-86; 1981 data does not include $1.150 billion estimated to be spent in 1983-85; 1980 data does not include $0.877 billion estimated to be spent in 1982-85.
3. 1985 data includes $0.022 billion for "solid waste" or unspecified; 1984 data includes $0.028 billion for "solid waste/unspecified;" 1983 data includes $0.015 billion for "solid waste/unspecified;" 1982 data includes $0.050 billion for "solid waste."
4. *P & P* estimate. 5. Includes unallocated funds of $0.246 billion for 1979 and $0.140 billion for 1978 surveys.

CANADA

P&P's reported three-year spending (C$ billion)

Year	Period	Production	Environment		Total	Annual capital expenditures[1]
			Water	Air		
1985	1984-86	C$3.625[2]	C$0.119[3]	C$0.124	C$3.870	C$ (1.15)[4]
1984	1983-85	3.166[2]	0.221[3]	0.189	3.557	1.09
1983	1982-84	3.990	0.295[3]	0.272	4.557[2]	1.06
1982	1981-83	3.949[2]	0.438[3]	0.365	4.752[2]	1.83
1981	1980-82	3.645[2]	0.303	0.329	4.277[2]	1.87
1980	1979-81	2.440[2]	0.187	0.135	2.078[2]	1.32
1979	1978-80	1.462	0.110	0.113	1.685	0.73

1. Data from Statistics Canada (excludes repair expenditures).
2. Based on *P & P* survey for 3-year period; not comparable to Statistics Canada data since *P & P* information can include only dollar amounts that have been released publicly. Please note: 1985 data does not include C$0.697 billion for projects to be completed in 1987 or later (C$0.669 billion production; C$0.028 billion environmental); 1984 data does not include C$0.502 billion for projects to be completed in 1986 and later (C$0.385 billion production; C$0.117 environmental); 1983 data does not include C$0.697 billion for projects to be completed in 1985 and later; 1982 data does not include C$0.814 billion estimated for projects to be completed in 1984-86; 1981 data does not include $0.643 billion estimated to be spent in 1982-85.
3. 1985 data includes C$0.007 billion for "solid waste" or unspecific; 1984 data includes C$0.005 billion for "solid waste;" 1983 data includes C$0.002 billion, and 1982 data includes C$0.031 billion designated for "solid waste" control. 4. *P & P* estimate.

vey, rising from 5% last year to 10% at present.

SOUTH STILL SHOWS THE WAY. Although the South still accounts for 60% of planned U.S. outlays, the latest figures do represent a dropoff from the South's 65% share in last year's survey. Spending programs in the South amount to $4.96 billion for the 1984-86 survey period. Major projects underway in the South include greenfield mills in South Carolina and Mississippi and major expansions in Alabama and South Carolina.

Total spending of $1.45 billion in South Carolina and $1.45 billion in Alabama make those two states the leaders for the third year in a row. Other leading southern states are Mississippi, at $560.0 million, and Louisiana, at $315.8 million.

Accounting for 17% of the U.S. total, the Midwest remains second in regional spending with total outlays of $1.34 billion. Michigan, with a large greenfield mill under construction, leads the region with $603.1 million in total spending, followed by Wisconsin with $560.9 million. Spending in the West climbed from 9% of the U.S. total in 1983 to 14% last year, and this year's survey shows spending of $1.19 billion, holding steady at 14%. A major expansion project and a greenfield mill make Washington state the leader in the West, with $764.6 million in total planned spending.

TOP SPENDERS IN U.S.

Companies which have reported capital spending plans of $100,000,000 or more, including both production and environmental programs

	1984-86	1983-85
Champion International	$1,118,442,000	$733,380,000*
International Paper	804,000,000	540,000,000
Union Camp	644,680,000	591,307,000
Great Northern Nekoosa	602,950,000	600,450,000
Bowater Inc.	531,130,000	148,910,000
Crown Zellerbach	529,000,000	454,000,000
Scott Paper	453,500,000	435,200,000
Hammermill Paper	369,651,000	130,722,000
Westvaco	310,100,000	129,100,000
Georgia-Pacific	300,800,000	n.a.
James River	300,470,000*	n.a.
Consolidated Paper	298,950,000*	96,100,000
Great Lakes/Ponderay	210,000,000*	—
Temple-Inland	194,800,000	n.a.
Potlatch	186,720,000*	44,253,000
Fort Howard Paper	173,500,000	132,000,000*
Pentair Industries	152,215,000*	121,715,000*
Mead	134,000,000	68,000,000
Chesapeake	110,000,000	57,500,000

*Includes programs for completion beyond 3-year period indicated.

Total cost of a multiyear project is assigned to year of startup.

REPORTED SPENDING 1984-86+, BY TYPE OF FACILITY[1]

UNITED STATES		
Wood/fiber	$ 416,968,000	5%
Pulping	1,748,062,000	21%
New machines	790,500,000	10%
Machine modifications	1,086,515,000	13%
Energy/power	1,651,754,000	20%
Miscellaneous/plant	2,059,463,000	25%
Production total	**$7,753,262,000**	**94%**
Water quality	$ 170,921,000	2%
Air quality	285,610,000	4%
Solid wate/unspecified	22,400,000	0%
Environmental total	**$ 478,931,000**	**6%**
Total spending	**$8,232,193,000**	**100%**
CANADA		
Wood/fiber	C$ 109,033,000	2%
Pulping	1,097,463,000	24%
New machines	476,000,000	10%
Machine modifications	1,159,244,000	26%
Energy/power	262,844,000	6%
Miscellaneous/plant	1,191,054,000	26%
Production total	**C$4,295,638,000**	**94%**
Water quality	C$ 132,410,000	3%
Air quality	132,465,000	3%
Solid wate/unspecified	6,730,000	0%
Environmental total	**C$ 271,605,000**	**6%**
Total spending	**C$4,567,243,000**	**100%**

1. Includes projects as announced for completion in 1987 and later, as reported by *Pulp & Paper Project Report*.
2. Dollar figure includes an estimated $1,057,500,000 for projects to be completed in 1987 and later ($1,020,750,000 production; $36,750,000 environmental).
3. Dollar figure includes an estimated C$697,481,000 for projects to be completed in 1986 and later (C$669,581,000 production; $C27,900,000 environmental).

SUMMARY OF U.S. PROJECTS— REPORTED EXPENDITURES, 1984-86[1] BY STATES (000 dollars)

STATE	PRODUCTION	ENVIRON-MENTAL	TOTAL
Alabama	$1,208,700	$ 1,391	**$1,210,091**
Arkansas	127,295	1,206	**128,501**
California	145,565	20,034	**165,599**
Connecticut	32,400	—	**32,400**
Florida	83,150	13,300	**96,450**
Georgia	121,222	11,700	**132,922**
Idaho	164,559	54	**64,613**
Indiana	1,036	—	**1,036**
Kentucky	42,000	—	**42,000**
Louisiana	297,900	17,850	**315,750**
Maine	254,663	15,450	**270,113**
Maryland	—	2,100	**2,100**
Michigan	526,970	76,147	**603,117**
Minnesota	38,608	11,129	**49,737**
Mississippi	476,000	84,000	**560,000**
Montana	7,600	—	**7,600**
New Hampshire	103,100	—	**103,100**
New Jersey	9,765	300	**10,065**
New York	75,300	—	**75,300**
North Carolina	84,900	21,300	**106,200**
Ohio	118,253	6,895	**125,148**
Oklahoma	115,000	—	**115,000**
Oregon	77,920	1,445	**79,365**
Pennsylvania	250,909	25	**250,934**
South Carolina	1,451,100	99,530	**1,550,630**
Tennessee	81,000	15,500	**96,500**
Texas	179,364	18,100	**197,464**
Virginia	404,342	6,250	**410,592**
Washington	733,100	31,500	**764,600**
West Virginia	250	4,150	**4,400**
Wisconsin	541,291	19,575	**560,866**
Total	**$7,753,262**	**$478,931**	**$8,232,193***

1. Includes projects, as announced, for completion in 1987 or later.
2. Dollar figure includes estimated $1,057,500,000 for projects to be completed in 1986 and after ($1,020,750,000 production; $36,750,000 environmental).

Spending in the Northeast is reported at $741.9 million for the 1984-86 survey period, or 5% of the U.S. total, with $270.1 million earmarked for Maine.

SPENDING BY CATEGORIES. Capacity additions are responsible for a large portion of the planned increase. Spending for new paper machines rose from 5% in the last survey to 10% in the current period, or $790.5 million. Expenditures for paper machine modifications continued to outstrip spending for new machines, however, despite the big jump in new machine announcements. In contrast, spending for machine modifications represented less than 80% of new machine expenditures in the 1982-84 survey period, and an average of only 54% in the early 1980s, when the last round of capacity additions was in full swing. Spending for machine modifications are reported at $1.09 billion in the current period, or 13% of the U.S. total, up from 11% in the 1983-85 period.

Outlays for energy and power facilities in the 1984-86 survey period total $1.65 billion, or 20% of U.S. spending, down 7% compared with the 1983-85 survey figures. The dropoff reflects the completion of four large boiler projects in 1983 and the postponement of several others.

Spending for wood and fiber projects in the 1984-86 survey period is reported at $417.0 million, or 5% of total outlays, while pulping projects amount to $1.75 billion, or 21% of U.S. expenditures. Neither category deviates significantly from last year's results.

Continuing to decline from the peak reached in the 1970s, environmental spending is expected to total only $478.9 million in the 1984-86 survey period, or 10% of total spending. This represents a 24.8% drop from last year's results. Expenditures for air quality ($285.6 million) outrank those for water quality ($170.9 million), as they have for the past five years. Solid waste programs total a modest $22.4 million, according to the survey, down from $28.2 million last year.

NEW MILLS AND MACHINES. Two greenfield mills started up late last year, and construction is now underway at two other sites. At Eastover, S.C., Union Camp Corp.'s 210,000-tpy uncoated free-sheet mill came onstream in September 1984. Also in September, Great Northern Nekoosa Corp. started up its 350,000-tpy bleached kraft market pulp mill at New Augusta, Miss. Temple-Inland Inc.'s 175,000-tpy recycled linerboard mill in Ontario, Calif., is scheduled to come online in late 1985, followed in 1986 by Champion International Corp.'s 750-tpd bleached kraft market pulp mill at Quinnesec, Mich. Champion has also recently announced plans to install a 500- to 600-tpd uncoated free-sheet machine at the Quinnesec mill in 1987.

MAJOR MODERNIZATION/ EXPANSION PROJECTS IN U.S.

(over $50,000,000 at an existing mill site)

Appleton Papers, Combined Locks, Wis.	$ 54,900,000
Bowater/Catawba Newsprint, Catawba, S.C.	64,350,000
Bowater Carolina, Catawba, S.C.	375,280,000*
Bowater Southern, Calhoun, Tenn.	91,500,000
Champion International, Canton, N.C.	66,500,000
Champion International, Bucksport, Maine	141,013,000
Champion International, Lufkin, Texas	89,266,000
Chesapeake, West Point, Va.	110,000,000*
Consolidated/Biron Div., Wisconsin Rapids, Wis.	229,850,000*†
Container Corp. of America, Fernandina Beach, Fla.	50,000,000
Crown Zellerbach, South Glens Falls, N.Y.	67,000,000*
Crown Zellerbach, Camas, Wash.	431,000,000*
Fort Howard Paper, Muskogee, Okla.	115,000,000*
Fort Howard Paper, Green Bay, Wis.	58,500,000*
Georgia-Pacific, Crossett, Ark.	100,000,000*
Georgia-Pacific (Port Hudson), Zachary, La.	200,000,000*
Gulf States Paper, Demopolis, Ala.	51,400,000*†
Hammermill Paper, Selma, Ala.	254,300,000*†
Hammermill Paper, Erie, Pa.	74,100,000
International Paper, Mobile, Ala.	300,000,000
International Paper, Georgetown, S.C.	475,000,000
James River (Naheola), Pennington, Ala.	65,000,000*
James River, Berlin, N.H.	50,000,000
Kimberly-Clark, Coosa Pines, Ala.	77,500,000
Mead, Chillicothe, Ohio	100,000,000
Pentair Industries, Niagara, Wis.	86,300,000
Potlatch, Lewiston, Idaho	163,638,000†
Scott Paper, Mobile, Ala.	300,000,000
Scott Paper, Chester, Pa.	115,000,000
Temple-Inland, Evadale, Texas	62,800,000
Westvaco, Charleston, S.C.	90,000,000
Westvaco, Covington, Va.	180,000,000*

*Includes new paper machine (also in listing of New Machines).
†Includes programs for completion in 1987 and later.

Data in this table necessarily omits expansion programs for which cost information has not been released.

GREENFIELD MILLS—PROJECTS IN U.S.

UNDER CONSTRUCTION OR STARTED UP IN 1984 — **STARTUP**

Champion International, Quinnesec, Mich. — **1986**
750-tpd bleached hardwood kraft pulp mill; 500- to 600-tpd uncoated free-sheet machine planned for 1987*

GNN/Leaf River Forest Products, New Augusta, Miss. — **1984**
350,000-tpy bleached hardwood and softwood kraft pulp mill

Temple-Inland, Ontario, Calif. — **1985**
175,000-tpy recycled linerboard mill*

Union Camp, Eastover, S.C. — **1984**
210,000-tpy uncoated free-sheet mill*

ANNOUNCED, WITH STARTUP DATE

Great Lakes/Ponderay Paper, Usk, Wash. — **1987**
154,000-tpy TMP/newsprint mill*

PROPOSED (NO DATE)

Augusta Kraft, Augusta, Ga.
Proposed 262,500-tpy kraft linerboard mill

Boise Cascade, S.C.
Proposed 800-tpd bleached kraft pulp mill, with possible later addition of newsprint or white paper capacity

Carolina Forest Industries, Bennetsville, S.C.
Proposed two-machine, 1,500-tpd TMP/newsprint mill

Champion International, Halifax, N.C.
Proposed bleached pulp/white paper mill studied

Champion International, Jasper, Texas
Proposed 1,000-tpd mill, kraft linerboard or white paper

Fort Howard, Southeast
Reportedly considering tissue mill

Georgia Kraft, Elberton, Ga.
Site purchased in 1981 for future 1,300-tpd linerboard mill

Grenada Paper, Grenada, Miss.
Proposed 215,000-tpy TMP/newsprint mill

Independent Kraft, Tuscaloosa, Ala.
280,000-tpy kraft linerboard mill, construction expected to begin in 1985*

Kimberly-Clark, Southeast
Reportedly considering disposable diaper pulp mill

*Machine is also included in New Machines listings.

Construction is scheduled to begin this year on Independent Kraft Corp.'s 280,000-tpy kraft linerboard mill in Tuscaloosa, Ala., although no startup date has been set. And a 154,000-tpy newsprint mill is scheduled to be built at Usk, Wash., by Great Lakes Forest Products Ltd. in association with several newspaper publishers. Announced just last month, the mill is scheduled for 1987 startup.

Four new paper machines started up in 1984 at U.S. mills, while an additional five units were scheduled to come online in 1985. Crown Zellerbach Corp. started up its new 160,000-tpy uncoated free-sheet unit at Camas, Wash., in July 1984, while Union Camp brought its Eastover machine online in September. Fort Howard Paper Co. began operating a new 250-tpd tissue machine at Green Bay, Wis., in August, while Cascades Industries Inc. started up its 50-tpd tissue machine—built with used components—at Rockingham, N.C., in October.

Scheduled for startup in 1985 are a new 275- to 300-tpd uncoated free-sheet machine at Georgia-Pacific Corp.'s Crossett, Ark., mill and two tissue machines, one at Crown Zellerbach's South Glens Falls, N.Y., mill and the other—a used machine—at Laurel Hill Paper Co. in Cordova, N.C. Also in 1985, Temple-Inland will bring online its 175,000-tpy recycled linerboard machine at Ontario, Calif., and Chesapeake Corp. will start up a new 900-tpd kraft linerboard machine at West Point, Va.

Six new machines have been announced for 1986 startup, while four are scheduled to come online in 1987. 1986 startups include tissue machines for Fort Naheola mill at Pennington, Ala., and Little Rapids Corp.'s mill in Potsdam, N.Y. Westvaco Corp. has announced plans to install a bleached paperboard machine at Covington, Va., in 1986.

Uncoated free-sheet machines are planned for G-P's Port Hudson, La., mill in 1986, Hammermill Paper Co.'s Selma, Ala., mill in 1987, and Champion's Quinnesec mill in 1987. Bowater Inc.'s Bowater Carolina mill in Catawba, S.C., will bring a lightweight coated paper machine onstream in 1986, while Consolidated Papers Inc.'s Biron Div. plans a lightweight coated machine at Wisconsin Rapids, Wis., in 1987. Finally, Great Lakes' Ponderay Paper mill in Usk, Wash., is expected to start up its new 154,000-tpy newsprint machine in 1987.

THE BIG SPENDERS. Most major U.S. paper companies plan to either increase capital spending or hold it at relatively high levels, according to recent annual reports. International Paper Co., for example, plans to spend $804 million as it completes its Georgetown, S.C., mill modernization and begins to restructure its Mobile, Ala., mill. Crown Zellerbach and Scott Paper are in the middle of ambitious, multiyear programs to modernize and restructure their operations. And a long list of companies—including James River, Bowater, Consolidated, Westvaco, and Hammermill—have recently announced major spending increases. One exception is Champion, however, which is expected to cut back its capital spending plans since the recent acquisition of St. Regis Corp.

UNITED STATES—REPORTED CAPITAL EXPENDITURES FOR 1984-86+[1] BY REGIONS AND BY TYPE OF FACILITY ($000)

PRODUCTION-RELATED EXPENDITURES

	WOOD/FIBER		PULPING		NEW MACHINES		MACHINE MOD.		ENERGY		MISC./PLANT	
New England	$ —	0%	$ 83,300	5%	$ —	0%	$ 124,636	12%	$ 143,727	9%	$ 38,500	2%
Mid-Atlantic	18,800	5%	20,000	1%	10,000	1%	109,341	10%	131,936	8%	45,897	2%
East North Central	72,638	17%	310,450	18%	60,000	8%	235,873	22%	175,065	10%	333,524	16%
West North Central	—	0%	—	0%	—	0%	4,615	0%	23,852	1%	10,141	0%
South Atlantic	153,280	37%	478,432	27%	360,500	45%	252,829	23%	290,301	18%	609,622	30%
East South Central	102,240	25%	467,500	27%	100,000	13%	170,000	16%	488,680	30%	476,280	23%
West South Central	22,000	5%	138,315	8%	110,000	14%	111,568	10%	122,521	7%	213,655	11%
Mountain/Pacific	48,010	11%	250,065	14%	150,000	19%	77,653	7%	275,672	17%	331,844	16%
Total	**$ 418,968**		**$1,748,062**		**$ 790,500**		**$1,086,515**		**$1,651,754**		**$2,059,463**	

ENVIRONMENTAL QUALITY SPENDING

	WATER		AIR		WASTE/UNSPEC.		TOTALS: PRODUCTION		ENVIRONMENT		GRAND TOTAL	
New England	$ —	0%	$ 13,950	5%	$ 1,500	7%	$ 390,163	5%	$ 15,450	3%	$ 405,613	5%
Mid-Atlantic	325	0%	—	0%	—	0%	335,974	4%	325	0%	336,299	4%
East North Central	41,958	25%	61,019	21%	—	0%	1,187,550	15%	102,617	22%	1,290,167	16%
West North Central	447	0%	7,082	2%	3,600	16%	38,608	0%	11,129	2%	49,737	1%
South Atlantic	50,125	29%	96,655	34%	11,550	52%	2,144,964	28%	158,330	33%	2,303,294	28%
East South Central	44,475	26%	55,900	20%	516	2%	1,804,700	24%	100,891	21%	1,905,591	23%
West South Central	7,942	5%	24,514	9%	4,700	21%	718,059	9%	37,156	8%	755,215	9%
Mountain/Pacific	26,009	15%	26,490	9%	534	2%	1,133,244	15%	53,033	11%	1,186,277	14%
Total	**$ 170,921**		**$ 285,610**		**$22,400**		**$7,753,262**		**$ 478,931**		**$8,232,193[2]**	

1. Includes projects, as announced, for completion in 1987 and later.
2. Dollar total includes estimated $1,057,500,000 for projects to be completed in 1986 and after ($1,020,750,000 production; $36,750,000 environmental).

Regions are as follows:
New England: Maine, Vt., N.H., Conn., R.I., Mass.
Mid-Atlantic: N.Y., N.J., Pa.
East North Central: Wis., Mich., Ill., Ind., Ohio
West North Central: N.Dak., S.Dak., Nebr., Kans., Minn., Iowa, Mo.
South Atlantic: Del., Md., W.Va., Va., N.C., S.C., Ga., Fla.
East South Central: Ky., Tenn., Miss., Ala.
West South Central: Okla., Texas, Ark., La.
Mountain/Pacific: Wash., Ore., Calif., Alaska, Idaho, Nev., Mont., Wyo., Utah, Ariz., Colo., N.Mex.

NEW PAPER MACHINES IN U.S.

UNDER CONSTRUCTION OR STARTED UP IN 1984 — **STARTUP**

Cascades Industries, Rockingham, N.C. — **1984**
50-tpd, 3,500-fpm, from used parts—tissue

Chesapeake Corp., West Point, Va. — **1985**
900-tpd, 258-in. Voith No. 3—linerboard

Crown Zellerbach, South Glens Falls, N.Y. — **1985**
6,000-fpm twin-wire—tissue

Crown Zellerbach, Camas, Wash. — **1984**
160,000-tpy, 276-in.-trim, Beloit twin-wire—uncoated free sheet

Fort Howard, Green Bay, Wis. — **1984**
250-tpd, 270-in. No. 10 Beloit twin-wire—tissue

Georgia-Pacific, Crossett, Ark. — **1985**
275- to 300-tpd, 280-in. No. 1 Sulzer Escher Wyss—uncoated free sheet

Laurel Hill Paper, Cordova, N.C. — **1985**
Used 50-tpd machine from James River mill—tissue

Temple-Inland, Ontario, Calif. — **1985**
175,000-tpy, 280-in. Tampella—recycled linerboard

Union Camp, Eastover, S.C. — **1984**
210,000-tpy, 372-in. Voith—uncoated free sheet

ANNOUNCED, WITH STARTUP DATE — **DATE**

Bowater Carolina, Catawba, S.C. — **1986**
197,000-tpy, 336-in., 3,500-fpm Beloit—lightweight coated

Champion International, Quinnesec, Mich. — **1987**
500- to 600-tpd machine—uncoated free sheet

Consolidated Paper/Biron Div., Wisconsin Rapids, Wis. — **1987**
500-tpd, 288-in.-trim, 3,700-fpm Voith—lightweight coated

Fort Howard, Muskogee, Okla. — **1986**
No. 4 machine—tissue

Georgia-Pacific (Port Hudson), Zachary, La. — **1986**
230,000-tpy, 378-in., 3,500-fpm Valmet—uncoated free sheet

Great Lakes/Ponderay Paper, Usk, Wash. — **1987**
154,000-tpy, 300-in.-trim twin-wire—newsprint

Hammermill, Selma, Ala. — **1987**
185,000-tpy, 350-in. Voith—uncoated free sheet

James River, Pennington, Ala. — **1986**
70,000-tpy, 260-in., 6,000-fpm Beloit twin-wire—tissue

Little Rapids Corp., Potsdam, N.Y. — **1986**
Used 50-tpd unit from Kimberly-Clark mill—tissue

Westvaco, Covington, Va. — **1986**
175,000-tpy, 278-in.-trim Voith—bleached paperboard

PROPOSED (NO DATE)

Blandin Paper, Grand Rapids, Minn.
Proposed 170,000- to 180,000-tpd machine—lightweight coated

Boise Cascade, International Falls, Minn.
Proposed new machine, on hold—uncoated free sheet

Champion International, unspecified
Proposed machine for St. Regis mill—lightweight coated

Independent Kraft, Tuscaloosa, Ala
280,000-tpy, 256-in.-trim; construction expected to begin in 1985—linerboard

Longview Fibre, Longview, Wash.
No. 12 machine—lightweight coated

Midtec Paper, Kimberly, Wis.
Studying new No. 7 machine—premium coated paper

Owens-Illinois, Tomahawk, Wis.
New machine to replace existing unit—corrugating medium

Philip Morris/Wisconsin Tissue, Menasha, Wis.
No. 4 twin wire, for probable 1986 startup—tissue

Potlatch, McGehee, Ark.
Possible second machine—solid bleached paperboard

Southeast Paper, Dublin, Ga.
Proposed second 450-tpd machine—recycled newsprint

Tagsons Paper, Mechanicsville, N.Y.
Reportedly considering new machine—tissue

Union Camp, Eastover, S.C.
Reportedly considering second machine—coated or uncoated free sheet

Westvaco, unspecified
150,000-tpy machine, 1985 announcement expected—coated free sheet

Weyerhaeuser, Columbus, Miss.
Addition of two machines postponed—uncoated free sheet, coated groundwood

CANADA

Upgrades lead spending rise; eastern firms dominate spending plans

■ Although slower to realize the benefits of the economic recovery than their U.S. counterparts, Canadian producers have taken their first steps toward rebuilding capital spending budgets to prerecession levels, *Pulp & Paper Project Report*'s 1984-86 capital spending survey shows. Canadian pulp and paper mills report plans to spend C$4.57 billion in the 1984-86 period, including $697.5 million in projects to be completed after 1986. This $4.57 billion is 27.7% higher than the $3.58 billion reported in last year's survey. In comparison, Canadian pulp and paper companies planned to spend $4.92 billion in the 1980-82 survey period, $5.57 billion from 1981 to 1983, and $5.25 billion in the 1982-84 period.

Quebec out in front. Mills in Quebec plan expenditures of $2.41 billion in the current survey period, or 53% of total Canadian outlays, up from 40% of total capital spending reported last year. Well over half of Quebec's total comes from four large projects, however, including Domtar Inc.'s $773-million, multiyear modernization at Windsor and expansion projects at Reed Inc., James Maclaren Industries Inc., and Donohue Inc. mills.

Capital outlays in second-place Ontario total $845 million in the 1984-86 survey, or 19% of total Canadian expenditures. Last year, Ontario's share amounted to 31% of overall spending. Only two projects in Ontario exceed $100 million in this year's results: Boise Cascade Canada Ltd.'s Kenora modernization and E.B. Eddy Forest Products Ltd.'s Espanola upgrade.

While continuing to lag the eastern regions, western Canada reported significant increases this year in spending plans. Expenditures in British Columbia and Alberta reported in the current survey total $643.9 million, or 14% of the Canadian total—double last year's 7% share of overall spending plans, the survey shows. Though much improved compared with last year, western spending still trails the $995 million mark reported in the 1983 survey by a wide margin.

COMPANY PLANS. Sixteen Canadian companies reported capital spending plans in excess of $100 million for the survey period, up from ten in last year's survey. Five of these top spenders include projects for completion beyond the 1986 cutoff date. Domtar's $1.02-billion total is almost four times higher than the next closest figure, Abitibi-Price Inc.'s $272.2 million.

Expansion plans reported in the 1984-86 survey period include 22 programs at existing mill sites, which are expected to exceed $50 million, up from 17 last year. The largest such program is Domtar's $773.0-million Windsor expansion, which includes two new paper machines. Reed Inc.'s multiyear expansion at Quebec City is reported at $260 million, while Western Pulp Inc.'s Squamish, B.C., upgrade is budgeted at $214 million, followed by Boise Cascade Canada's $210-million expansion at Kenora.

Spending by categories. Capital expenditures for pulp production normally account for 35% or more of Canadian spending, *P&P*'s surveys show. In contrast to past

years, however, this year's survey shows pulp projects totaling only $1.10 billion in the 1984-86 survey period, or 24% of total capital outlays. Also down sharply are energy expenditures, which fell to 6% of the total this year from 11% last year, and environmental outlays, down to 6% this year from 12% in the 1983-85 period.

The major change in the current period is the shift away from pulping and energy projects toward capacity-expanding machine modifications and new paper machines. Machine modification projects have been the fastest growing segment of Canadian expenditures in the past two surveys. This year's total of $1.16 billion for 1984-86 represents 26% of total spending, up from a 14% share last year and only 5% in 1983.

Spending for new machines is reported at $476 million for the survey period, up from $215 million last year. This year's total represents 10% of total outlays, up from 5% last year—and more in keeping with the 12% level reported by Canadian firms before the recession.

Outlays for production-related projects in the 1984-86 survey represent 94% of Canadian spending, up from 88% last year. Environmental spending in the current period is $271.6 million, or 6% of total expenditures. Of total environmental spending, $132.4 million is for water quality projects, $132.4 million for air quality projects, and $6.7 million for solid waste disposal.

SUMMARY OF CANADIAN PROJECTS— REPORTED EXPENDITURES 1984-86[1] BY PROVINCES (C$000)

PROVINCE	PRODUCTION	ENVIRON-MENTAL	TOTAL
Alberta	C$ 101,150	C$22,150	**C$ 123,300**
British Columbia	484,554	36,035	**520,589**
Manitoba	43,200	135	**43,335**
New Brunswick	250,784	34,450	**285,234**
Newfoundland	206,700	—	**206,700**
Nova Scotia	122,822	—	**122,822**
Ontario	837,317	7,700	**845,017**
Quebec	2,234,161	171,135	**2,405,296**
Saskatchewan	14,950	—	**14,950**
Total	**C$4,295,838**	**C$271,805**	**C$4,567,243[2]**

1. Includes projects, as announced, for completion in 1987 and later.
2. Dollar total includes an estimated C$697,481,000 for projects to be completed in 1986 and after (C$689,581,000 production; C$27,900,000 environmental).

NEW PAPER MACHINES IN CANADA
(metric tons)

UNDER CONSTRUCTION OR STARTED UP IN 1984 — **STARTUP**

Great Lakes Forest Products, Dryden, Ont. — **1984**
122,000-tpy, 194-in., 3,000-fpm Valmet—fine paper

James Maclaren Industries, Masson, Que. — **1985**
170,000-tpy, 330-in.-trim, 4,500-fpm Beloit—newsprint

Scott Paper, New Westminster, B.C. — **1984**
36,000-tpy, 180-in.-trim, 5,500-fpm KMW—sanitary tissue

ANNOUNCED, WITH STARTUP DATE

Domtar Inc., Trenton, Ont. — **1986**
176-in.-trim, 350-tpd, to add 30,000 tpy—semichemical medium

Domtar Inc., Windsor, Que. — **1988-89**
Two machines, one in 1986, one in 1989—uncoated free sheet

Makin Pulp & Paper, Drayton Valley, Alta. — **1986**
150,000-tpy, from Allimand/Valmet of France—groundwood

Repap Enterprises, Newcastle, N.B. — **1986**
170,000-tpy, with off-machine coater—groundwood

PROPOSED (NO DATE)

Abitibi-Price, Iroquois Falls, Ont., Grand Falls, Nfld., Alma, Que.
Proposed twin-wire machines, indefinitely postponed—newsprint

Great Lakes Forest Products, Dryden, Ont.
Possible 175,000-tpy machine—newsprint

Kruger Inc., Trois Rivières, Que.
Proposed 172,000-tpy No. 10 Beloit unit (in storage)—newsprint

TOP SPENDERS IN CANADA
Companies which report capital spending plans of C$100,000,000 or more, including both production and environmental programs

	1983-85	1982-84
Domtar	C$1,021,014,000*	C$166,500,000
Abitibi-Price	272,150,000*	299,250,000
Boise Cascade Canada	261,800,000	n.a.
Reed	260,000,000	120,000,000
Kruger	237,000,000	n.a.
Western Pulp	229,200,000	248,000,000
James Maclaren	224,000,000	255,271,000
Repap Enterprises	223,000,000	n.a.
Consolidated Bathurst	203,000,000*	543,961,000*
Tembec Forest Products	174,700,000*	43,225,000*
E.B. Eddy Forest Products	141,690,000*	320,900,000*
Donohue	131,152,000	31,000,000
Makin Pulp & Paper	115,000,000	—
Ontario Paper Co.	114,891,000	144,891,000*
CIP	102,000,000	211,100,000
Great Lakes Forest Products	101,400,000	383,700,000

*Includes programs for completion beyond 3-year period indicated. Total cost of multiyear project is assigned to year of startup.

GREENFIELD MILLS— PROJECTS IN CANADA
(metric tons)

ANNOUNCED, WITH STARTUP DATE

Makin Pulp & Paper, Drayton Valley, Alta. — **1986**
150-tpd CMP/groundwood mill, with coating plant at nearby Red Deer

Repap Enterprises, Newcastle, N.B. — **1986**
170,000-tpy lightweight coated mill, with pulp supplied from nearby Nelson-Miramichi and Newcastle pulp mills

Tembec Pulp, Temiscaming, Que. — **1987**
98,000-tpy bleached CTMP pulp

PROPOSED (NO DATE)

Atco Ltd., Rocky Mountain House, Alta.
Proposed Brazeau Timber Area fine paper mill

Consolidated-Bathurst, Matane, Que.
180,000-tpy CTMP mill being studied

Doman Industries, Nanaimo, B.C.
Proposed 500-tpd TMP mill, possibly to include newsprint machine, on indefinite hold

Prince Albert Pulp, Prince Albert, Sask.
Proposed newsprint mill or aspen pulp mill

Rexfor, Matane, Que.
Proposed 160,000-tpy newsprint or lightweight coated mill

NEW MILLS AND MACHINES ANNOUNCED. After a hiatus of several years, three new greenfield mill projects with firm startup dates were announced in 1984. Makin Pulp & Paper announced plans to construct a 150-tpd groundwood paper mill at Drayton Valley, Alta. Associated with the Drayton Valley mill will be a coating plant in Red Deer, Alta. Startup is scheduled for 1986. Repap Enterprises announced plans to build a 170,000-tpy lightweight coated paper mill at Newcastle, N.B. The mill is to be supplied with slush pulp via pipeline from nearby Repap mills in Newcastle and Nelson-Miramichi. Startup is set for 1986. Tembec Pulp & Co. Limited Partnership will build a 98,000-tpy bleached chemithermomechanical market pulp mill at Temiscaming, Que. That mill is scheduled to come online in 1987.

The Makin mill is located in the Brazeau Timber Development Area, which has been the focus over the past several years of most of the greenfield mill proposals in Canada. One proposal still under consideration is for a fine paper mill at Rocky Mountain House, to be built by Atco Ltd. Other greenfield proposals have focused on the Matane, Que., area. Consolidated-Bathurst Inc. has studied a 180,000-tpy CTMP mill for Matane, while the Quebec government agency Rexfor has proposed a 160,000-tpy newsprint or lightweight coated paper mill for the area.

Two new paper machines started up in Canada in 1984. Great Lakes Forest Products brought onstream a 122,000-tpy fine paper unit at Dryden, Ont., early in the year. And Scott Paper Ltd. started up a 36,000-tpy sanitary tissue machine at its New Westminster, B.C., mill in April 1984. Five additional paper machines have been announced with startup dates, four in 1986 and one in 1989. Domtar Inc. will bring online a semichemical medium machine at the Trenton, Ont., mill in 1986, adding 30,000 tpy to mill capacity. In addition, Domtar will install two new uncoated free-sheet machines at the Windsor, Que., mill. The first is scheduled to come onstream in 1986, followed by the second in 1989.

Makin Pulp & Paper plans to start up a 150,000-tpy groundwood unit at the new Drayton Valley mill in 1986, and Repap's 170,000-tpy groundwood machine is also scheduled for 1986 startup. ■

MAJOR MODERNIZATION/ EXPANSION PROJECTS IN CANADA

(over C$50,000,000 at an existing mill site)

Abitibi-Price, Alma, Que.	C$57,100,000
Abitibi-Price, Jonquiere, Que.	77,000,000
Boise Cascade Canada, Fort Frances, Ont.	51,300,000
Boise Cascade Canada, Kenora, Ont.	210,500,000
Bowater Mersey, Liverpool, N.S.	71,000,000
Consolidated-Bathurst, Ville de La Baie, Que	61,100,000†
Domtar, Cornwall, Ont.	87,100,000†
Domtar, Donnacona, Que.	56,160,000
Domtar, Windsor, Que.	773,000,000*†
Donohue, Clermont, Que.	131,152,000
E.B. Eddy Forest Products, Espanola, Ont.	100,842,000†
Great Lakes Forest Products, Dryden, Ont.	95,800,000*
James Maclaren Industries, Masson, Que.	148,000,000*
James Maclaren Industries, Thurso, Que.	76,000,000
James River-Marathon, Marathon, Ont.	95,000,000
Kruger, Corner Brook, Nfld.	167,000,000†
Kruger, Trois Rivieres, Que.	70,000,000
Ontario Paper, Baie Comeau, Que.	86,587,000
Reed, Quebec City, Que.	260,000,000
Scott Paper Ltd., New Westminster, B.C.	63,000,000*
Tembec Forest Products, Temiscaming, Que.	66,700,000†
Western Pulp, Squamish, B.C.	214,000,000

*Includes new paper machine (also in listing of New Machines).
†Includes projects for completion in 1987 and later.
Data in this table necessarily omits expansion projects for which cost information has not been released.

CANADA—REPORTED CAPITAL EXPENDITURES FOR 1984-86+[1] BY REGIONS AND BY TYPE OF FACILITY (C$000)

PRODUCTION-RELATED EXPENDITURES

	WOOD/FIBER		PULPING		NEW MACHINES		MACHINE MOD.		ENERGY		MISC./PLANT	
Maritimes	$ 24,845	23%	$ 81,789	8%	$ 50,000	10%	$ 246,750	21%	$ 96,236	37%	$ 80,686	7%
Quebec	33,665	31%	403,410	37%	248,000	52%	653,042	56%	84,114	32%	811,930	68%
Ontario	41,725	38%	222,117	20%	118,000	25%	207,842	18%	47,255	18%	200,378	17%
Central	—	0%	36,100	3%	—	0%	13,200	1%	5,400	2%	3,450	0%
West	8,798	8%	354,047	32%	60,000	13%	38,410	4%	29,839	11%	94,610	8%
Total	**$ 109,033**		**$1,097,463**		**$ 476,000**		**$1,159,244**		**$ 262,844**		**$1,191,054**	

ENVIRONMENTAL QUALITY SPENDING

	WATER		AIR		WASTE/UNSPEC.		TOTALS: PRODUCTION		ENVIRONMENT		GRAND TOTAL	
Maritimes	$ 17,725	13%	$ 16,725	13%	—	0%	$ 580,306	13%	$ 34,450	13%	$ 614,756	13%
Quebec	72,110	55%	96,300	73%	2 725	40%	2,234,161	52%	171,135	63%	2,405,296	53%
Ontario	4,050	3%	1,250	1%	2,400	36%	837,317	20%	7,700	3%	845,017	19%
Central	—	0%	135	0%	—	0%	58,150	1%	135	0%	58,285	1%
West	38,525	29%	18,055	13%	1,605	24%	585,704	14%	58,185	21%	643,889	14%
Total	**$ 132,410**		**$ 132,485**		**$ 9,730**		**$4,295,638**		**$ 271,690**		**$4,567,243[2]**	

1. Includes projects, as announced, for completion in 1987 and later.
2. Dollar total includes estimated C$697,481,000 for projects to be completed in 1987 and after ($669,581,000 production; $27,900,000 environmental).

Note: Tabulations are based on these regional divisions: "Maritimes" is New Brunswick, Newfoundland, and Nova Scotia; "Central" is Manitoba and Saskatchewan; "West" is British Columbia and Alberta; Ontario and Quebec are treated individually.

U.S. paper industry to lift capacity by 1.6%/year over next three years

1984 capacity addition plans were revised upward by API in its most recent survey, adding 784,000 tons to its year-earlier projections

By WILLARD E. MIES, Executive News Editor

■ Mills found ways to raise capacity by more than they had been expecting in 1984, leading American Paper Institute (API) to increase its estimate of 1984 capacity by 784,000 short tons from what had been anticipated a year ago. Due to similar causes, 1983 capacity was 312,000 tons higher than had been expected in 1982.

These were among the results published in the association's annual capacity survey, released in late November. Senior vice president Norma Pace also reported that API now expects capacity to rise at a 1.6%/year rate in the next three years (1985-87), reaching 76.3 million tpy at that time, compared with a 1.5% annual growth rate projected in 1983's survey for the 1984-86 period.

Printing and writing papers are in the forefront of capacity expansion in the survey as they were the major reason for the upward revision in the 1984 capacity number. Producers are hoping the same robust market conditions that led them to search for new capacity in the last two years will justify their decision to add capacity at a 3.6%/year rate in the 1985-87 period—a more rapid pace than the 3.4%/year printing/writing capacity growth rate of the 1975-84 period and more than twice the expected 1985-87 rate for the entire paper industry.

Revised 1984 capacity. When mills told API in 1983 what they expected their 1984 capacity to be, printing/writing mills gave a figure that was 921,000 tons lower than API now estimates for 1984. Business has been so good that mills have worked very hard to get increments of production from the system. The bulk of the difference was in coated paper and uncoated free sheet, where capacity turns out to be 320,000 tons and 529,000 tons higher, respectively, than previously projected.

In addition to startup of some new machines, API believes the industry will shut down 39 machines in the five-year 1983-87 period, including 15 complete mill closures. This removes 1.4 million tpy from the survey, although 371,000 further tons represent machines that could be reactivated. Leading the total is the packaging

TABLE 1: **Growth trends in U.S. pulp and paper capacity.**

	Additions 1975-84		Additions 1985-87	
	10-year	Average annual growth (%)	3-year	Average annual growth (%)
Total paper and paperboard	**13,222**	**2.0**	**3,568**	**1.6**
Total paper	8,319	2.6	2,283	2.0
Newsprint	2,215	1.7	(55)	(0.3)
Printing/writing	5,642	3.4	2,183	3.6
Packaging and industrial converting	(369)	(0.6)	(222)	(1.3)
Tissue	921	2.0	377	2.3
Total paperboard	4,903	1.5	1,285	1.2
Unbleached kraft	3,825	2.5	572	1.1
Solid bleached	266	0.7	252	2.0
Semichemical	789	2.2	174	1.1
Recycled	22	—	287	1.1
Total woodpulp	**10,002**	**1.9**	**2,460**	**1.4**
Dissolving and special alpha	(320)	(1.9)	—	—
Sulfite	(675)	(3.2)	(2)	—
Sulfate and soda*	8,678	2.3	2,186	1.7
Semichemical	336	0.8	85	0.6
Mechanical	1,982	4.0	191	1.0

*Includes screenings. ( ) = Decline.

TABLE 2: **Regional distribution share of U.S. capacity changes, 1984-87 (%).**

	Northeast	Central	South	West
Total paper and paperboard	**10.8**	**17.1**	**63.3**	**8.8**
Newsprint	—	—	—	—
Printing/writing	12.2	20.9	58.0	8.9
Tissue	28.6	15.0	57.1	(0.7)
Unbleached kraft paperboard	—	—	88.7	11.3
Semichemical paperboard	0.4	27.5	58.1	14.0
Total woodpulp	**1.4**	**15.1**	**75.4**	**8.1**
Sulfate and soda	1.2	13.9	76.1	8.8
Semichemical	1.4	20.1	79.7	(1.2)
Mechanical	2.5	21.5	69.3	6.7

( ) = Loss.

and industrial converting group, with five machines expected to be shut down, representing 372,000 tpy of capacity. After the survey was completed, International Paper Co. announced permanent closure of its 255,000-tpy Camden, Ark., kraft paper mill.

The South continues to dominate the news in the area of capacity growth: with 52% of total paper and board capacity in 1983, it will claim 63.3% of capacity expansion in the 1984-87 period. All other regions of the country show a smaller share of future expenditures than their present share of capacity.

Another significant trend is the gradual increase of recyclable paper and primary fibers as a percentage of total fiber requirements, while "woodpulp produced from manufacturing and forest residues is expected to decline from 31.2% to 29.9% of total fiber consumed," according to the survey. Recyclable paper should rise from 23.2% to 24.2% of total fiber needs; primary woodpulp will climb from 44.9% to 45.3%. A record 72.4 million tons of woodpulp, recyclable paper and other raw materials were consumed in 1984, while capacity requirements by 1987 would bring total consumption to 77.2 million tons.

Newsprint. The U.S. industry's rapid newsprint capacity expansion is over. Capacity will fall by 55,000 tons by 1987 due to shutdown of one machine in 1984 and two more in 1985, which alone will remove more than 300,000 tons from capacity totals.

Printing and writing paper. At least seven new machines are planned for the next three years, which, with other additions, will increase capacity by 2.2 million tons. If all the planned expansions are implemented, capacity will reach nearly 22 million tpy, or 29% of all paper and board capacity.

Tissue. Capacity expansions for tissue papers, including sanitary and industrial grades, will average 2.3%/year in the three-year 1985-87 period, reaching 5.6 million tons. This growth rate compares with the 2%/year rate of the period from 1974 to 1984, and "confirms the more aggressive plans of tissue paper producers that were reported in 1983's survey," according to API.

Packaging papers. During the past decade, capacity for unbleached kraft packaging papers fell by 435,000 tons. These losses have mainly reflected increased competition from alternative packaging materials, pressuring producers to switch machines to other grades or shut down marginal properties. These trends will continue.

Kraft linerboard and semichemical paperboard. Only one new liner machine and no semichemical machines are scheduled for startup after 1984, so that growth in containerboard capacity is expected to average little more than 1% annually. However, a number of expansion projects have been under study and some additional kraft paper capacity could be shifted to linerboard.

Solid bleached paperboard. After a ten-year period of low growth—averaging just 0.7%/year—this industry is now planning expansions averaging 2%/year, bringing on 252,000 tons of new capacity.

Recycled paperboard. Restructuring of the recycled board industry has been the rule for many years now, with more than 100 machines and over 3 million tons of capacity being idled permanently between 1970 and 1984. Over the next three years, however, a different picture should emerge: a new machine is scheduled to start up, and new expansions industry-wide should add 287,000 tons of capacity over the three-year period.

Sulfate and soda pulps. A greenfield pulp mill and other major expansions are expected to increase capacity by 1.7%/year, totaling 2.2 million tons of new capacity. All expansions will be in bleached and semibleached kraft, which will expand in capacity by 10% and boost their share of sulfate pulps from 51.1% in 1984 to 53.6% in 1987. Unbleached pulps will lose share and also show an absolute drop in capacity.

Market pulp. Market pulp capacity will rise from 5.7 million tons in 1984 to 6.2 million tons in 1987. This 2.8%/year rate compares with the 1.7%/year rate of all sulfate pulps and continues a decade-long expansion which has raised U.S. market pulp capacity by more than 60%. ■

TABLE 3: **Paper and paperboard annual capacity, 1984-87 (000 tons).**

	1984	1985	1986	1987
Total paper and paperboard	**72,720**	**73,700**	**74,973**	**76,317**
Total paper	**35,851**	**37,297**	**38,100**	**39,134**
Newsprint	5,847	5,758	5,765	5,792
Printing/writing	19,770	20,462	21,087	21,953
Uncoated groundwood	1,693	1,710	1,712	1,713
Coated groundwood	3,701	3,744	3,863	4,262
Coated free sheet	2,704	2,849	2,959	3,069
Uncoated free sheet	10,083	10,559	10,915	11,266
Cotton fiber	176	180	180	181
Thin papers	338	338	338	338
Solid bleached bristols	1,075	1,082	1,119	1,126
Packaging and industrial converting	5,991	5,755	5,754	5,769
Unbleached kraft	3,954	3,704	3,700	3,705
Bleached packaging and industrial converting	566	571	556	556
Specialty packaging	551	554	563	565
Special industrial	919	926	934	942
Tissue	5,243	5,322	5,494	5,620
Total paperboard	**36,869**	**36,403**	**36,874**	**37,183**
Unbleached kraft	17,790	18,027	18,214	18,362
Kraft linerboard	16,488	16,723	16,914	17,052
Solid bleached	4,187	4,321	4,354	4,439
Semichemical	5,219	5,299	5,350	5,393
Recycled	8,702	8,756	8,956	8,989
Total construction paper and board and other	**2,877**	**2,869**	**2,864**	**2,864**

TABLE 4: **Woodpulp annual capacity, 1984-87 (000 tons).**

	1984	1985	1986	1987
Total all grades woodpulp	**59,481**	**59,069**	**60,237**	**60,868**
Total woodpulp*	**57,139**	**57,800**	**58,968**	**59,598**
Dissolving	1,504	1,504	1,504	1,504
Chemical paper grades	44,980	45,650	46,721	47,165
Sulfite paper grades	1,726	1,718	1,722	1,724
Sulfate and soda paper grades	43,255	43,932	44,999	45,441
Bleached and semibleached softwood	12,429	12,954	13,339	13,518
Bleached and semibleached hardwood	9,663	10,105	10,671	10,823
Unbleached	21,163	20,873	20,989	21,100
Semichemical	4,569	4,609	4,624	4,654
Mechanical	6,054	6,005	6,088	6,245
Screenings	31	31	31	31
Total woodpulp for construction paper and board	**1,322**	**1,269**	**1,269**	**1,269**

*Excludes pulp for construction paper and board.

1984 saw budworm population fall, but 13-year infestation isn't over yet

Northeastern pulp and paper industry faces serious shortfall by the year 2000 unless forest management is intensified; in some areas it's too late

By NANCY J. LARSEN, Staff Editor

■ Eastern North America's 13-year battle with the spruce budworm rages on. At stake are the balsam fir and spruce forests, a prize the region's pulp and paper industry cannot afford to surrender. It has been a costly fight and it is not yet over, although 1984 brought some relief to the beleaguered forests as the population of insurgent insects underwent a general decline.

Most forest management experts agree that this respite does not indicate an end to the war, and unless long-range programs of forest management are intensified in combination with continued protection, a shortfall in the supply of balsam/spruce will affect the pulp and paper industry within the next 20 to 50 years.

The current epidemic, unprecedented in both intensity and size, is the third major infestation this century. In spite of ongoing investigation into the causes of these cyclical swells in the eastern spruce budworm population, conclusive answers have not yet been found.

Traditional theory proposes that budworm epidemics begin in the forests of western Ontario and move eastward. A more recent theory postulates that incipient epidemics incubate in mixed-wood forests with large numbers of white spruce and hardwood. From this epicenter, huge numbers of insects radiate to softwood forests, where, like Sherman through Georgia, they defoliate and destroy.

It is widely believed that the budworm reaches epidemic proportions when climatic conditions—several years of warm dry spring weather—coincide with the existence of an adequate food supply—large numbers of mature fir/spruce trees. The present outbreak seems to support several of these suppositions. The outbreak began in the late 1960s in the forests of Ontario, Quebec and central New Brunswick. At that time, eastern North American forests were even-aged and dominated by mature and over-mature balsam and spruce, regenerated after the last major infestation in the early 1900s.

Thus the record number of insects, coinciding with an unprecedented abundance of food, has produced the severest budworm infestation yet witnessed—so severe that areas such as Nova Scotia and Newfoundland, relatively untouched by past outbreaks, have sustained unparalleled damage.

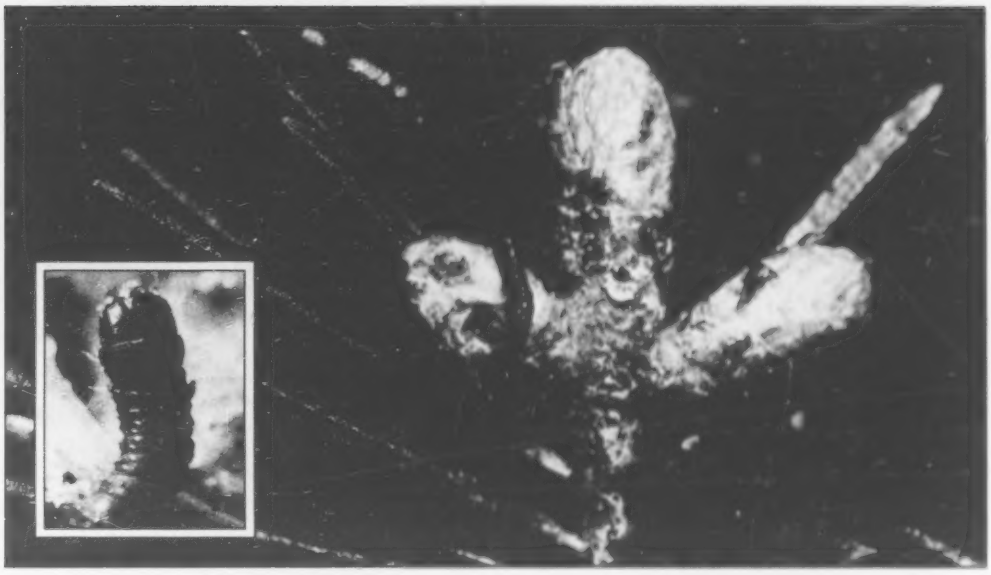
DAMAGE REPORT. According to one Canadian forestry expert, "If one were to get on a plane and fly over the forests of northeastern Canada, one could fly for five hours and see nothing but damaged trees, dead trees, dying trees."

Losses of prime softwood sustained by the Canadian and American paper industry in some regions range from severe to catastrophic. They are as follows:

- Maine—3 to 5 million cords of prime softwood, or $100 million worth of timber, has been destroyed
- Ontario—100 million m^3 of primarily balsam fir killed
- Quebec—losses totaling 91 million m^3 of pulpwood through 1983 are expected to increase to 161 million m^3 by 1986. This lost volume would represent enough wood to keep all the mills in the Thunder Bay region of neighboring Ontario operating for about 30 years
- New Brunswick—in 1983, 2.2 million m^3 of balsam fir and 1.7 million m^3 of spruce were lost
- Newfoundland—20 to 28 million m^3 of wood lost to the budworm
- Nova Scotia—loss sustained by the pulp and paper industry to date is quoted at C$2 billion of pulpwood. Cape Breton's highlands have lost 24 million m^3 of wood, or a ten-year supply to the Port Hawkesbury mill.

1984'S DOWNWARD TREND. Much of the budworm-besieged region saw a decline in the insect's numbers in 1984. In 1983, northwestern and southeastern portions of Maine's fir/spruce range experienced high levels of budworm infestation. Current reports indicate that 1983's figure of 4.0 million acres of moderately to severely infested fir/spruce forest will have declined to 3.0 million acres in 1984.

According to Thomas Rumpf, forest insect manager with Maine's Dept. of Conservation, there is no clear indication as to why the trend is downward, but declines have occurred in the past. "It's not a collapse of the population or anything, it's more a fluctuation in popula-



AT RIGHT: **Called "the bug that is eating eastern North America," *Choistoneura fumiferana*, or eastern spruce budworm, will feast on red spruce, white spruce and black spruce, preferring treetops and branch tips.** *INSET:* **A close-up picture of the budworm larva is shown.**

tion, a natural fluctuation."

New Brunswick is also witnessing a general reduction in the infestation's scope and intensity. The budworm epidemic dropped by approximately one-fifth in 1983 as large continuous areas of infestation broke up into smaller patches. Surveys indicate that 10 million acres of forestland were expected to remain moderately to severely infested in 1984, however.

Early in 1984, Newfoundland's forestry minister Charlie Power announced that the infestation was at a manageable stage, while a spokesman for Newfoundland's Dept. of Forest Resources countered that although insect populations have declined since the late 1970s, "the budworm is such a dynamic pest, we still consider it to be a threat."

1983 brought a surge in budworm numbers for Nova Scotia's western and northern mainland counties, as well as portions of the Cape Breton highlands. For 1984, however, budworm-inflicted damage was expected to drop by half. However, Ken Streatch, Forest Minister, warns that the threat posed by the insect will hang over the forests "like Damocles' sword" for decades.

For Quebec, 1984 marked the first decline in budworm numbers since 1980. In 1983, the area of infestation increased by 8 million acres to a total of over 32 million acres.

Ontario will not share in 1984's respite. According to Gordon House of the Great Lakes Forest Research Station in Ontario, "We have several outbreaks within the province, which we follow separately . . . . What we are seeing is changes within those regional outbreaks, and this affects the overall totals for the province. Thus we are seeing some increases in northwestern Ontario, a doubling or tripling of the extent of infestation each year, in recent years. And we are looking at a further increase next year."

Characterizing the whole outbreak, Dr. House reported, "My impression is that things do seem to be declining somewhat in the eastern part of Canada, in a very general sense. But there will be exceptions to that. By and large, there seems to be a pattern of decline in eastern Canada, essentially from northeastern Ontario to the East."

DESTRUCTIVE DEFOLIATOR. Armed with only a voracious appetite and a fondness for balsam fir or spruce, an innocuous-looking brown caterpillar barely an inch long has proven to be the pulp and paper industry's arch enemy. Called "the bug that is eating eastern North America," *Choistoneura fumiferana*, or eastern spruce budworm, is indigenous to the northern spruce/fir forests of Canada and the U.S.

The spruce budworm preferentially attacks balsam fir, but lacking that, will feast on red spruce, white spruce and black spruce, in declining order of choice. If unchecked, infested trees are progressively defoliated until they die, with balsam fir the least able to withstand budworm feeding.

The *fumiferana* has a one-year life cycle, with adult moths emerging from the pupal stage at the end of July, mating, laying eggs and dying within 14 days. Eggs are deposited on the underside of needles and hatch in two weeks. The newly emerged larvae find shelter on the tree (under bark scales and in flower and needle scars), spin a silky web cover, and hibernate over the winter.

Spring marks the reappearance of rapacious larvae, who feed on fresh needles, flowers and buds. Preferring treetops and branch tips, larvae will feed upon old foliage in extreme infestations. From late June to mid-July, larvae enter the pupal stage and prepare to start the cycle once again.

Natural predators, weather and food supply all affect larval growth and insect mortality, and under ordinary conditions keep the number of larvae below one per 18-in. branch tip.

When the larval count exceeds one to two larvae per 18-in. tip, most regions consider the number potentially serious enough to implement natural control with spraying. If the count grows to 10 to 15 larvae per 18-in. tip, all new foliage will be consumed. Surveys taken at the height of this current outbreak counted 50 to 100 larvae per 18-in. branch tip in many areas.

CHEMICAL WARFARE. To date, spraying of chemical insecticides remains the single most effective, least costly method of protection of the forest against the rampaging budworm. However, chemical spraying is controver-

sial, facing highly visible and increasingly militant opposition. Exemplifying the impact this emotional debate has already had on forest industry practices, a group of private citizens—citing the inherent danger spraying could pose to human health—successfully sued earlier this year to halt application of herbicides on national forestland in Oregon and Washington. Citizen opposition has prevented Nova Scotia for years from employing the kind of massive spraying program relied on by neighboring New Brunswick.

Caught on the horns of a dilemma, those states and provinces facing the budworm must choose either to spray in an effort to contain loss of invaluable wood resources—and face mounting public opposition—or to discontinue protective spraying and allow wide-scale tree mortality. A cohesive and unifying plan of action has not been found, and protection programs vary from province to province, state to state.

Maine and New Brunswick have perhaps the most aggressive spraying policies; New Brunswick spends approximately C$14 million dollars per year on protective spraying. Other regions, like Quebec and Ontario, have adopted a more conservative spraying program, concentrating protection on selected areas while abandoning others. Ontario, for instance, focuses on protection of commercial forests, seed production areas, parks, plantations and animal habitats. At the other end of the spectrum from Maine and New Brunswick is Nova Scotia, which, following a policy instituted in the mid-1970s, prohibits the use of all chemical insecticides.

Most forest managers, while aware of the need to keep spray programs at minimum levels due to health risks, concur with a CIP Inc. spokesman who said, "Though spraying is not 100% effective, there is ample evidence to confirm that spraying can protect trees."

Another industry spokesman from Quebec, critical of his province's spraying program, said, "We haven't been able to protect our forest; we lost it . . . we sprayed for five years (and stopped). If we had sprayed for another three to four years, we really probably would have protected it. With areas that we continued to spray for the four years, we can prove the spraying operation was effective . . . but unfortunately, it wasn't enough."

With ever-mounting claims and counterclaims surrounding the issue of protective spraying, the need for viable alternatives clearly increases.

POSSIBLE SOLUTIONS. *Bacillus thuringiensis* (BT) may provide the solution to the controversy surrounding chemical spraying. BT is a bacterium that, when ingested by the budworm larva, paralyzes its stomach and kills it. Described as a safe alternative to chemical spraying, this organic substance does not have any adverse effect on plants, animals, or humans. As BT wins approval from opponents of chemical spraying, it is also making inroads into spraying programs throughout eastern North America. Once only erratically effective and more than six times as expensive as chemical insecticides, BT has rapidly improved in both efficacy and cost.

In spite of application limitations and slightly higher cost, Maine will increase use of BT from 15% to 20% of its total spraying program. Quebec planned to spray 1.9 million acres in 1984, utilizing BT on approximately 741,000 acres, which represents an increase of over six times the area treated with BT in 1983. New Brunswick increased total area treated with BT from 20,000 acres in 1983 to 75,000 acres in 1984. Ontario's current protection program utilizes BT almost exclusively, while Nova Scotia, using only BT, will spray about 70,000 acres.

TABLE 1: **Budworm infestation levels—moderate to severe (000 acres).**

Region	1983	1984
Maine	4,000	n.a.[1]
New Brunswick	5,000	n.a.[1]
Newfoundland	247.1	154.0
Nova Scotia	726.5	617.8
Ontario	22,500	30,000
Quebec	32,000	n.a.

1. n.a. = Not available, but trend is downward.

OTHER VIABLE ALTERNATIVES. Research into other environmentally safe alternatives to protective spraying continues. While experiments conducted with sex pheromones, the chemical emitted by the female moth during the mating season to attract the male, have proven unsuccessful as a means of budworm control, work in this area indicates that manipulation of this behavioral mechanism can effectively serve as a monitoring aid. Pheromone traps offer an improved alternative to current survey methods of egg mass and larval counts, and according to one forestry expert, "a better tool in the future to keep track of the beast."

Physiological control—disruption of the budworm's natural growth cycle—is also being explored, but while research continues, results have been inconclusive.

Experimentation with biological control is also underway. In Ontario a small wasp, the *trichogramma minutum*, a natural predator of the spruce budworm, has been released in numbers exceeding one-half million per acre in the hope that the insect, which kills budworm egg masses, will bring about a sizable decline in future budworm populations. The future may provide the forest manager with a number of available options for control of the budworm. However, the war against the budworm must be waged on two fronts.

GREEN WOODS MODEL. "Protection is effective in delaying, although not preventing, the wood shortfall," according to Thomas Rumpf, forestry insect manager with Maine's Dept. of Conservation. Past studies have shown that budworm outbreaks are related to age and class distribution and past forest management. Reflecting the opinion of most forestry experts, Rumpf stated that if effects of the anticipated shortfall are to be mitigated, "concerted action must be undertaken now, not only to maintain protection programs but also to ensure the future existence of a healthy, vigorous forest, a forest less vulnerable to the budworm." In order to generate a continuous yield from this resource, the forests have to be meticulously managed and regenerated, said Rumpf.

The Maine forest service, wanting to implement the most efficient forest management strategy, contracted James Sewall Co. to analyze Maine's future supply of spruce and fir. The analysis considered a number of variables, such as different methods of protection, management and harvesting practices. Results from this analysis, called the Green Woods Model, are applicable to all of eastern North America.

The study focused on two general questions: could

current harvest levels be sustained, based on existing harvesting and management levels; and if a shortfall does occur, what would be its magnitude, when might it occur, and what mitigating actions might be undertaken? Using a computer model, empirical data was combined with various selected variables.

Results confirmed that a wood shortfall will occur early in the twenty-first century if Maine's harvesting levels (2.8 million cords/year) and protection program (20% of total spruce/fir inventory) remain constant.

Suggested means for extending the life of the old forest by keeping the existing spruce alive include increased spraying, commercial thinning in high-volume spruce stands, and concentrated cutting of budworm-damaged trees. Maintenance of current harvest levels would then be possible until the year 2000. After the year 2000, it is suggested that Maine's pulp and paper industry reduce harvesting by 25%. This reduction might be offset by innovative technology, such as wholetree utilization and use of alternate species.

This new forest should be less budworm-vulnerable. Inherent in this statement are the following requirements, according to the Green Woods approach: the new forest should have an improved age class structure and have a composition favoring black spruce, which is least vulnerable to budworm attack.

Recent reports from Newfoundland indicate, however, that large stands of black spruce have died after a spruce budworm attack. Initial studies conducted by the provincial government indicate that many of these stands now support significant numbers of secondary pests, which attack weakened or severely defoliated trees. It is suspected that the feeding damage to the black spruce by the spruce budworm has so weakened the trees that they are vulnerable to secondary insects.

Despite the alarming possibilities this report conjures, most foresters feel that this single incident does not detract from the potential that black spruce evidences as a way of regenerating a forest in which the pulp and paper industry can minimize direct competition with the budworm. Present replanting programs in most regions are using black spruce almost exclusively.

Concluding on an optimistic note, the Green Woods Model asserts that if the new forest can come to harvestable size at younger ages, land accessible to harvest will increase, and forests will require less protection.

No one is willing to predict when the budworm epidemic will end. Nor can anyone guess how much longer the besieged forests can survive. What effect the looming shortfall will have on the war-weary pulp and paper industry remains unanswered.

Only one prediction is made without hesitation by all experts: the future will bring new budworm infestations. As one pulp and paper executive asked, "Are we going to be ready next time? Are we going to have the willingness to do things we haven't been willing to do this time? The time for action is when the forest is free of budworms, that is the time for extremely intensive work to be carried on . . . but when there isn't a problem, people aren't interested in spending money on it. But that is precisely the time when we should be increasing our efforts." ■

Complete Systems Available

- Long retractable sootblowers
- Wall Blowers
- Automatic Control Systems

COPES VULCAN

One of the Wilton Consolidated Industries

For further information please contact

USA—Copes-Vulcan, P.O. Box 577, Lake City, PA 16423
Phone: 814-774-3151 Telex: 91-4414

UK—Copes-Vulcan Limited, Road Two, Industrial Estate, Winsford, Cheshire CW7 3QL, England
Phone: (060 65) 52041 Telex: 66-8771 © 1983 WCI

510

On Reader Service Card **Circle 166**

- Broad line of standard valves — 3/4″ thru 24″ in pressure classes 125 thru 2500 . . . 4500 for special applications
- Custom designed valves for severe duty applications
- Noise attenuation trim for critical pressure drop liquids and gasses.

COPES VULCAN

One of the Wilton Consolidated Industries

For further information please contact

USA—Copes-Vulcan, P.O. Box 577, Lake City, PA 16423
Phone: 814-774-3151 Telex: 91-4414

UK—Copes-Vulcan Limited, Road Two, Industrial Estate, Winsford, Cheshire CW7 3QL, England
Phone: (060 65) 52041 Telex: 66-8771 © 1983 WCI

509

On Reader Service Card **Circle 167**

TiO_2 demand continues to rise as imports hold steady

By BARRY SHOCKETT

Although TiO_2 imports had reached 122,000 tons by the end of July (210,000 tons annualized), the monthly rate was expected to decline for the last five months of 1984. On the other hand, exports in 1984 should have continued to increase to 104,000 tons, 61,000 tons having left the country in the January to July period. Based on seven-month statistics, production was running 9% ahead of the comparable 1983 period. Total 1984 output was probably about 7.5% greater than 1983. Combined shipments from Canadian and European sources made up 21% of total demand in 1983 but could drop off slightly in 1984 to about 20%.

U.S. statistics, titanium dioxide (000 short tons)

	1981	1982	1983	1984e
Capacity	1,005	950	905	909
Production	750.5	650	757.5	814
Imports	125	139	175	175
Exports	61	68	93.5	104
Apparent consumption	814.5	721	839	885

Source: Bureau of Census, U.S. Dept. of Commerce. e = Estimated.

Canadian statistics, titanium dioxide (000 short tons)

	1981	1982	1983	1984e
Capacity (nameplate)	82.7	82.7	82.7	88.2
Production	78.8	79.4	82.7	86
Imports	7.8	6.4	16	17.5
Exports	15.4	17.6	25.4	28
Apparent consumption	71.2	68.2	73.3	75.5

TITANIUM DIOXIDE

UNITED STATES

Uses: Rutile and anatase grades of TiO_2 are used as fillers and coating pigments by the paper industry in printing/writing papers and paperboard. The largest end-use is in paints (50%), followed by plastics (12%), rubber, ceramics, and other applications.

Demand: In 1983, the paper industry consumed an estimated 197,000 tons of TiO_2—up 14.5% from the previous year—accounting for almost 24% of total TiO_2 demand (839,000 tons). Continued growth of both paper and paperboard should have resulted in overall industry usage increasing to an estimated 216,000 tons in 1984 (up about 9.5%).

Sources: The five U.S. producers, in descending order of capacity, are E.I. DuPont, SCM Corp., NL Industries, Kerr-McGee, and Gulf + Western. At the end of 1984, NL Industries had agreed to acquire American Cyanamid's Savannah, Ga., facility. (NL had closed its plant in Sayreville, N.J., two years ago.) SCM is expanding its Ashtabula, Ohio, plant (acquired in 1983 from G+W) by 22%. Kerr-McGee completed the first phase of its expansion at Hamilton, Miss., in the third quarter of 1984. The second stage is scheduled to come onstream early in 1985.

Availability: No shortage of TiO_2 is anticipated as about 15,000 tons of new capacity will have come onstream by 1985. 1984, market; 1983, market; 1982, market; 1981, market; 1980, market; 1979, anatase, market; rutile, tight.

Pricing: List prices for both anatase and rutile grades are still unchanged from late 1981. However, the 5¢/lb increase on July 1 brought the market price to the posted levels. This was the third boost in 1984 (following a 1.5¢/lb hike in October 1983). The previous increases came in April (3¢/lb) and January (2¢/lb). Pricing history, anatase: 1984, 70¢/lb, delivered; 1983, 70¢/lb; 1982, 70¢/lb; 1981, 58¢-70¢/lb; 1980, 57¢/lb; 1979, 53¢/lb; 1978, 46¢/lb; rutile: 1984, 75¢/lb; 1983, 75¢/lb; 1982, 75¢/lb; 1981, 63¢-75¢/lb; 1980, 57¢/lb; 1979, 59¢/lb; 1978, 52¢/lb.

Forecast: Demand for TiO_2 is expected to continue to improve both domestically and on a worldwide basis. With NL Industries returning to domestic production, imports in 1984 will have probably equaled the 1983 record of 175,000 tons. As the economy continues to improve, a further 5% to 6% price hike could occur this year.

CANADA

Uses: About 90% of the anatase TiO_2 used by the paper industry is employed by fine paper mills, with paperboard applications accounting for the rest. The paint industry is the largest dioxide consumer (55%), followed by plastics (17%), and rubber and miscellaneous uses (14.5%).

Demand: Paper industry usage in 1983 was 9,400 tons, about 1,100 tons more than the previous year. In 1984, mill consumption should have risen about 12% to 10,500 tons—14% of total TiO_2 demand. In 1984, imports were expected to be about 17,500 tons compared with 16,000 tons in 1983.

Sources: The two domestic producers are NL Chem Canada and Tioxide Canada. In 1983, 42% of the imports (22% of total demand) was from the U.S.; the balance came from Europe.

Availability: Despite the high operating rate (close to 98%), any increase in domestic demand could easily be satisfied by reducing exports until new capacity comes onstream. 1984, anatase, market; 1983, market; 1982, market; 1981, market; 1980, market; 1979, market; 1978, market.

Pricing: List prices for untreated anatase, which had been unchanged since January 1982, rose 5¢/lb on Sept. 10. The lists had been discounted by 2¢/lb from the period February to November in 1983. Pricing history: 1984, 80¢ to 85¢/lb, bags, delivered; 1983, 80¢/lb; 1982, 74.5¢-80¢/lb; 1981, 69¢-74.5¢/lb; 1980, 59¢-69¢/lb. (Note: Slurry shipments are 0.5¢/lb extra.)

Forecast: TiO_2 demand by the paper industry should increase 6%/year until 1988; total dioxide consumption grows between 6% and 7% until 1988.

Mr. Shockett, of Corpus Information Services, Don Mills, Ont., is consulting editor, chemical markets, for Pulp & Paper.